

Forest Stewardship Plan for the Clear Creek Conservation Project



PLAN PREPARED BY



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January 15, 2015

SIGNATURE PAGE

This Forest Stewardship Management Plan meets all Forest Stewardship Forest Management Planning Standards as developed by the U.S. Department of Agriculture, Forest Service, State and Private Forestry's Forest Stewardship Program.

Biological, economic, social, and political constraints which help to shape this stewardship plan are constantly changing and create a dynamic environment. In the event that these constraints undergo change which affects the plan, it will be modified accordingly. All management practices implemented through this plan will reflect a dedication by the landowner to good forest stewardship.

Approval Signature:

Representative:
Montana Department of Natural Resources and Conservation,
Forestry Division

Date:

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Property Location

The Clear Creek Conservation Project (CCCP) is located in Powell County, Montana, approximately 8 miles southeast of Helmville, Montana. The Property is situated in the Nevada Creek Valley drainage in the Blackfoot River watershed. The Nature Conservancy currently owns and manages the subject property but plans to transfer ownership of the property in the near future to the Montana Department of Fish, Wildlife & Parks.

Table 1: Legal Description of Clear Creek Conservation Project

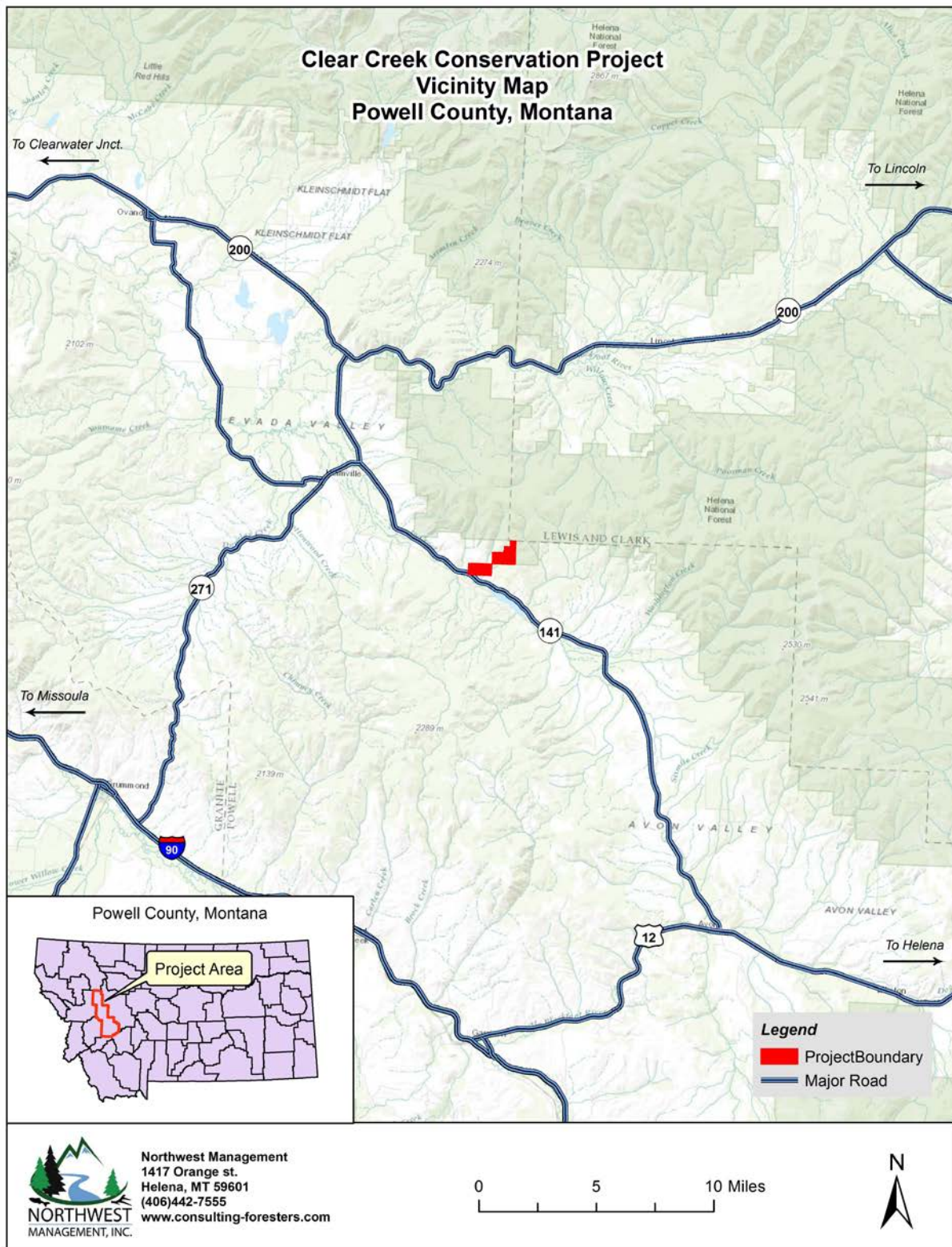
PLSS Township & Range	Section	Clear Creek Conservation Project Lands	Total Parcel Acreage
T 12 North, R 10 West	1	S ½ and portions of NE ¼	440.03
T 12 North, R 10 West	11	N ½	320.00

Surrounding Land Use

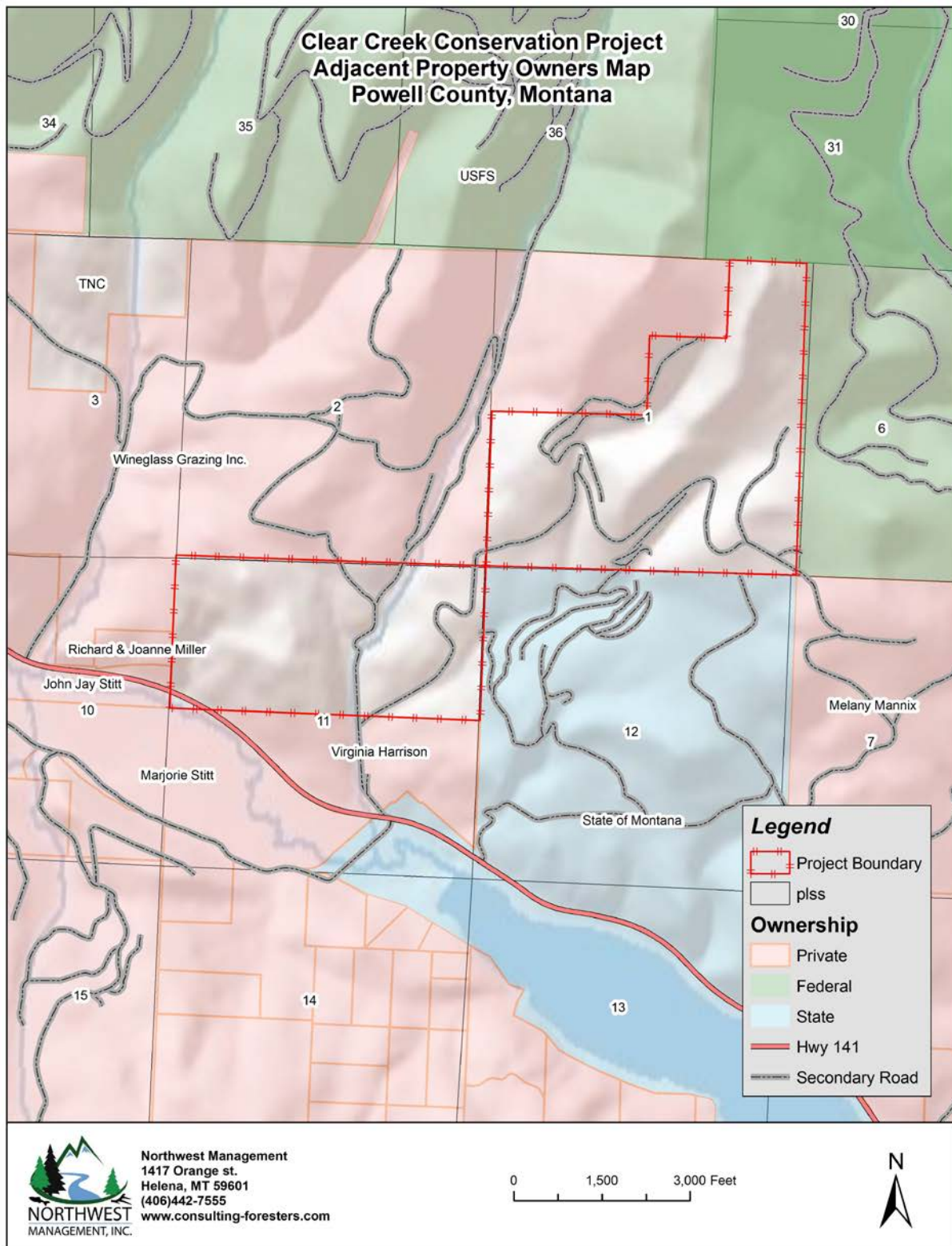
Lands in Section 1 are bordered to the north by private land owned by Wineglass Grazing, Inc., and the Lewis and Clark National Forest. The east boundary adjoins the Lewis and Clark National Forest. The property is bounded to the south by the Nevada Lake Wildlife Management Area administered by the Montana Department of Fish, Wildlife & Parks (MTFWP). The west boundary is adjoined by private ranchland owned by Wineglass Grazing, Inc. Adjoining lands are primarily managed for timber production, livestock grazing and wildlife habitat.

CCCP land in Section 11 is bordered to the north by private land owned by Wineglass Grazing, Inc. which is used primarily for livestock grazing and timber production. The west and south boundaries are bordered by privately owned tracts of land used for rural residential and recreational purposes. The east boundary is bordered by the Nevada Lake Wildlife Management Area administered by the Montana Department of Fish, Wildlife & Parks (MTFWP). The Nevada Lake WMA is managed for wildlife habitat –specifically to maintain and enhance winter range for elk and mule deer.

CCCP Project Vicinity Map



CCCP Adjacent Ownership Map



Property Description

Topography

The CCCP is located on foothills along the interface between the mountains to the north and the Nevada Creek valley floor to the south. The property encompasses several steep draws which converge in the main Chicken Creek drainage in the southern portion of the CCCP property in Section 11. The property is moderately to steeply-sloped with a predominately southern aspect. Elevation ranges from a low of 4550 feet above sea level in the bottom of the Chicken Creek drainage to 6360 feet above sea level at the at the highest point of the property in the northeast corner of Section 1.

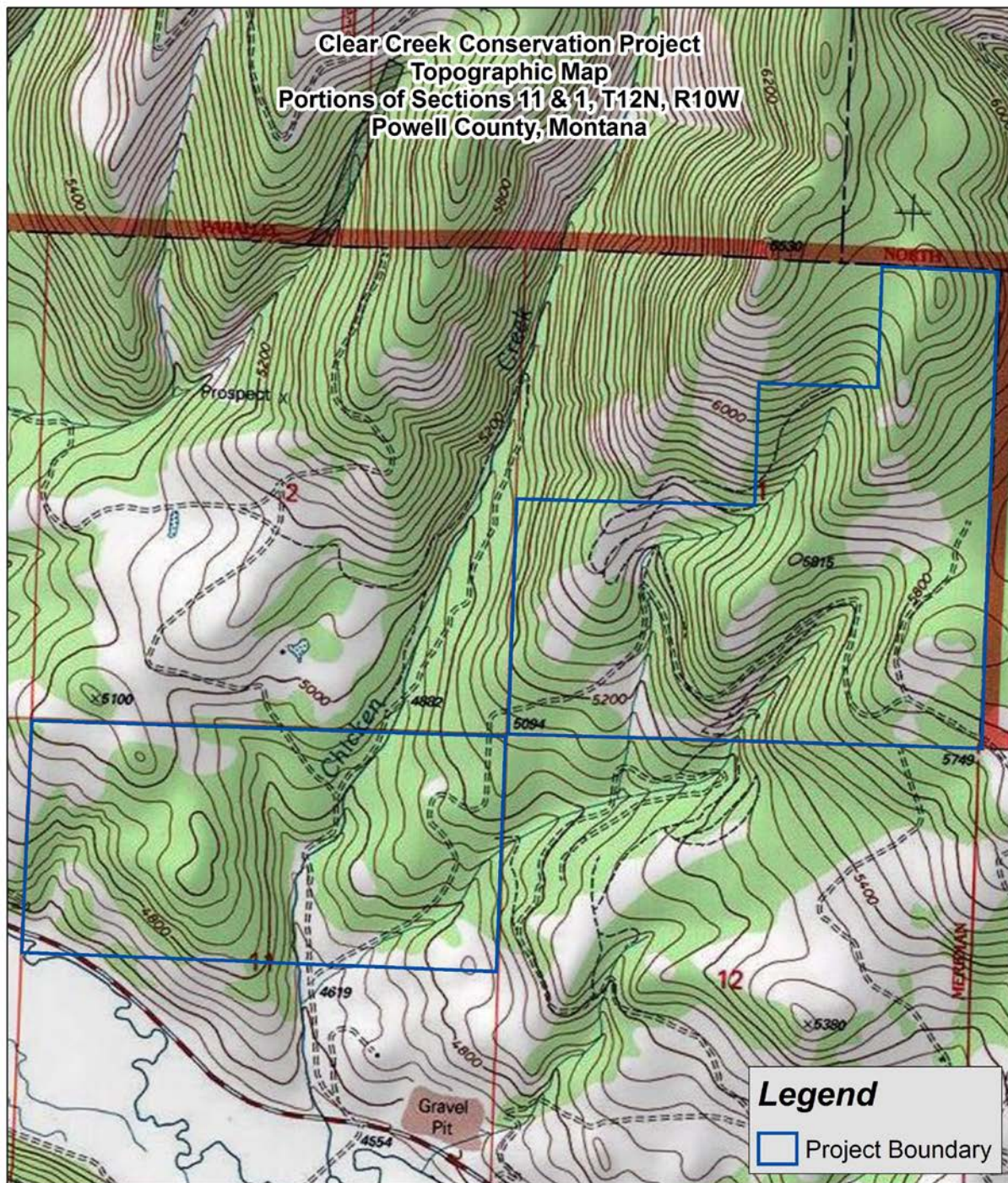
Weather

Western Regional Climate Center data for Ovando, MT is shown below. Ovando is 20 miles air miles to the northwest of the CCCP and is the closest reporting station. The climate station's elevation is similar to the lowest elevation within the CCCP property.

Table 2: Monthly Climate Summary

OVANDO, MONTANA (246304)													
Period of Record Monthly Climate Summary													
Period of Record : 8/ 5/1976 to 2/28/2011													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	29.3	33.9	43.8	54.4	63.1	71	80.3	80.1	69.5	56.1	39.4	28.7	54.1
Average Min. Temperature (F)	5.8	8.4	18.6	24.9	32	38.8	41.6	39.5	31.5	22.5	15.4	5.9	23.7
Average Total Precipitation (in.)	0.84	0.58	0.57	0.84	1.76	1.83	1.1	1.11	1.06	0.81	0.96	0.92	12.37
Average Total Snow Fall (in.)	8.6	5.3	4.2	1.5	0.3	0.1	0	0.1	0.4	1.6	5.3	9.6	36.9
Average Snow Depth (in.)	5	5	1	0	0	0	0	0	0	0	1	3	1

CCCP Topographic Map

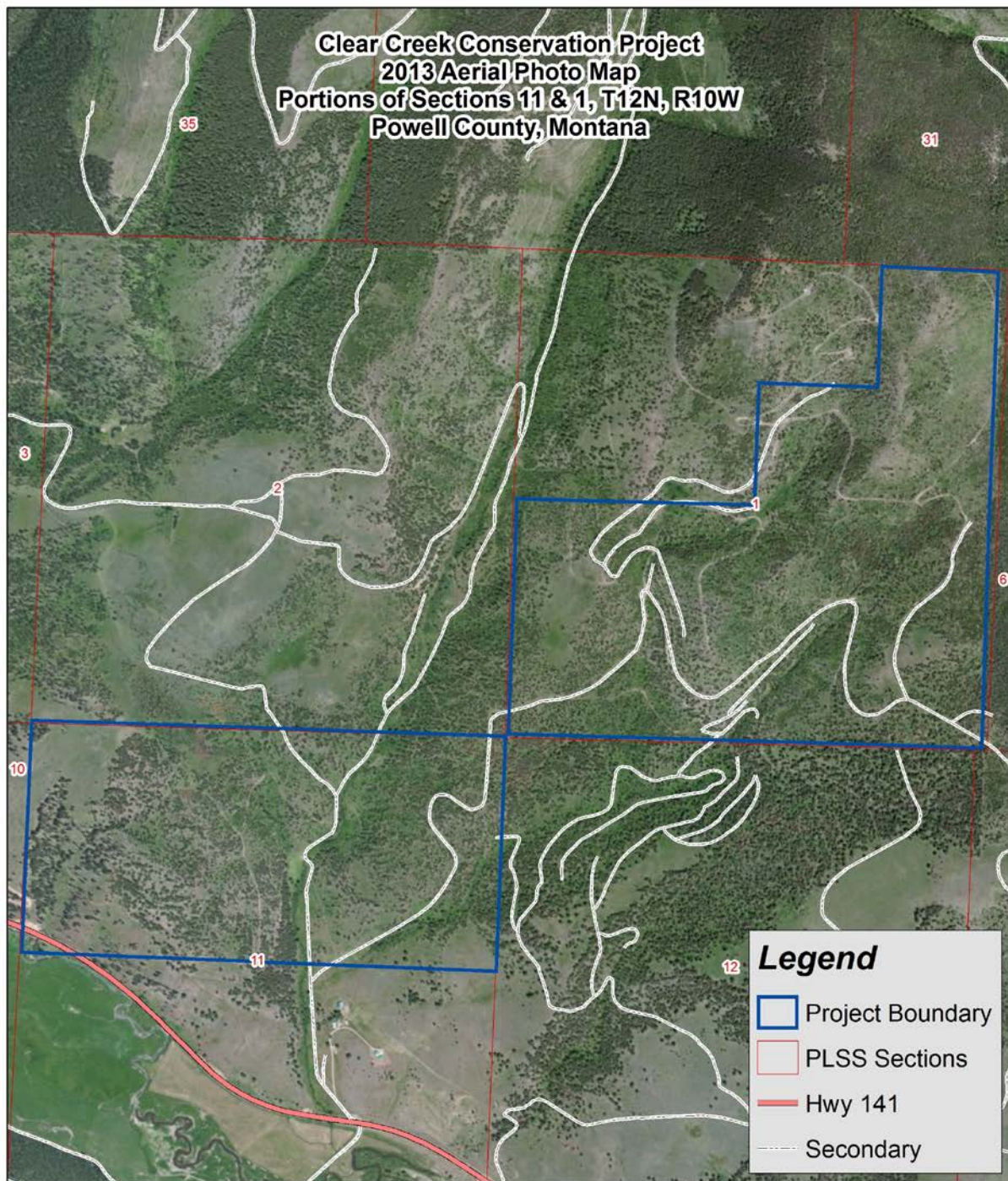


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0 500 1,000 2,000 3,000 Feet



CCCP 2013 Aerial Photo Map



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0 500 1,000 2,000 3,000 Feet

2013 Imagery



Forest Management Goals

This Forest Stewardship Plan will address forest management goals for the Clear Creek Conservation Project Area. The primary goals of this plan are listed below.

1. Improve and maintain winter range for elk and mule deer.
2. Improve and maintain upland and riparian wildlife habitat for a diversity of native wildlife species.
3. Improve and maintain forest health by reducing the potential for catastrophic wildfires and outbreaks of forest insects and diseases.
4. Create and maintain diversity of forest structure, tree age classes and tree species with an emphasis on maintaining old-growth trees.
5. Provide recreational opportunities for the public.
6. Reduce abundance of noxious weeds and minimize their spread.

Goals Discussion

The forest management goals listed above will receive primary consideration during the development of forest management recommendations. Forest management recommendations are provided for each forest stand type identified on the property. Specific forest stand type recommendations are designed to be realistic and achievable for the landowner based upon the physical limitations of the specific site (topography, soils, elevation, access, and aspect), financial considerations, and biological constraints. It may not be possible to achieve every goal on every acre but stand recommendations will identify where significant potential exists to achieve one or more ownership goals.

Resource Category I: Forests

Forest Health

Forest health can be defined in numerous ways; a proper definition is dependent upon the objectives and management philosophy of the landowner or agency administering the land. A landowner seeking maximum timber production might define a healthy forest as fast-growing, disease-free and fully occupied with trees of desirable species. A landowner seeking to maintain forested wildlife habitat for as many wildlife species as possible may wish to have some dead, dying and diseased trees in their forest, as well as older, slow-growing trees. These trees can provide important wildlife habitat and contribute to a more biologically and structurally diverse forest ecosystem.

For purposes of the Clear Creek Conservation Project's forest stewardship plan, a healthy forest is defined as being biologically and structurally diverse, fire-tolerant, and comprised of healthy, vigorously growing trees as well as healthy, slow-growing mature trees with long-term viability. A healthy forest will have a lower potential for catastrophic damage from wildfire, drought, forest insect infestation and disease.

There are some general principles to consider when evaluating the health a forest. It is generally desirable to have a mix of tree species and age classes. The appropriate mix of adapted tree species will vary by forest type. Forest areas that are dominated by a single species and are mostly of the same age are more vulnerable to insect and disease infestations. If all the trees in a forest are of a susceptible species, age, size or condition for a particular forest insect or disease, the entire forest may be damaged or killed rather than a single component. Having trees of different species and different ages increases diversity thereby increasing the overall resilience and resistance of the forest to damage by insects and disease. Diversity within a forest also contributes to its overall ability to withstand other ecological disturbances such as wildfire and climate-related stress. Having a mix of trees with fire-adapted characteristics such as ponderosa pine and trees capable of surviving in a wide range of environments such as Douglas-fir contributes to the long-term viability of a forest. This biological and structural diversity, in turn, creates more robust and dynamic habitat for wildlife.

Diversity at the forest level is a key consideration of forest health on the Clear Creek property; however, forest management also needs to focus on forest health at the individual tree level. Trees compete with each other for essential resources and therefore need adequate growing space to be healthy. Dense thickets can provide cover and habitat diversity for wildlife and can be an important component of a healthy forest. However, they are not necessarily conducive to growing healthy trees. Healthy trees grow faster and are more capable of surviving a wildfire and withstanding insect and disease damage. Managing tree density through creating and maintaining proper tree spacing is important for increasing the health and vigor of individual trees and is therefore important for maintaining a healthy forest.

Several forest health issues pertinent to forest on Clear Creek Conservation Project land are presented in the following sections and discussed in greater detail.

Protect Healthy, Large-Diameter Trees

Due to multiple logging entries over the course of past ownership of the Clear Creek Conservation Project (CCCP) property, large trees are scarce in most areas –particularly in Section 1. The primary threat to the health of the mature, large-diameter Douglas-fir and ponderosa pine that currently remain on CCCP lands is overcrowding by young trees.

Overcrowding creates competition between trees for vital resources needed for healthy tree growth. In the arid environment of the CCCP the most limiting resource is water in the form of soil moisture. Light is also a limiting resource as increasing crown competition gradually deprives trees of the solar radiation they need to photosynthesize. Excessive competition between trees stresses individual trees. Stress decreases a tree's growth rate and increases its susceptibility to forest insects and diseases.

Thinning reduces competition between trees. It helps to maintain adequate soil moisture and light availability for remaining trees thereby increasing their vigor. To reduce overcrowding of mature trees, young trees should be cleared for a distance of 25-50 feet away from larger trees. For smaller trees (less than 15 inches in diameter), there should be a minimum of 10 feet of distance between the trees outermost branches and the branches of the closest neighboring tree. This can be accomplished by both pre-commercial and commercial thinning. Steep slopes may preclude the use of ground-based machinery to complete commercial thinning on some of CCCP land in Section 1.

Promote A Fire-Tolerant Forest

In addition to competition, forest overcrowding also leads to excessive fuel loading, ladder fuels and tightly spaced tree crowns. High fuel loads produces conditions which are conducive to high-intensity wildfires. Continuous fuel sources from the forest floor up to tree crown level serve as ladder fuels which ground fires can climb to become more destructive crown fires. The horizontal crown continuity of tightly spaced trees creates the potential for a running crown fire. While ground fires can be manageable for firefighting personnel and cause limited tree mortality, a running crown fire is lethal to trees and extremely difficult to combat. As a forest becomes overcrowded it becomes less and less capable of withstanding a wildfire.

Once again, thinning is a good option as a management activity to address this forest health issue. It is the most practical means of modifying a forest to increase its tolerance to wildfire. Clearing small trees adjacent to and beneath large trees removes ladder fuels. Thinning breaks up crown continuity and decreases the overall amount of fuel available to wildfire.

Strategically placed fuel breaks are also an effective tool to proactively minimize the risk of a large-scale catastrophic wildfire. On CCCP land, where wildlife forage is a key consideration, fuel breaks could serve the dual purposes of increasing rangeland while breaking up trees as a continuous fuel sources.

Encourage Tree Species Diversity

Thinning also provides a method of maintaining or modifying the tree species composition and structure of forests on the CCCP. Douglas-fir is a generalist tree species that can grow in a wide array of conditions. It is tolerant of understory conditions, and, in the absence of disturbance, it eventually outcompetes and overtops less understory-tolerant tree species. Currently, it is the dominant tree species in nearly all forested portions of the CCCP property. However, in certain areas, site conditions are favorable for other tree species such as ponderosa pine and lodgepole pine. These species are currently underrepresented as a result of past logging, inter-tree competition and high levels of mortality from a recent mountain pine beetle epidemic. Where possible, these pine species should be preferentially retained in order to bolster their representation within the forest. This will create a more diverse composition of tree species and maximize the specific ecological services that each species contributes to the forest ecosystem as a whole.

Forest Insects and Diseases Common to CCCP Conifer Tree Species

Conifer tree species of commercial importance present on the property include Douglas-fir, ponderosa pine and lodgepole pine. Aspen is the primary deciduous tree species present on the CCCP property. It is mostly limited to riparian areas. Reducing the risk of severe insect and disease epidemics can be achieved with appropriate forest management. Forest insect and disease problems that potentially impact tree species present on the property are described below.

Douglas-fir is vulnerable to defoliation, stem decay and mortality from a variety of forest insects, diseases, and fungi. Significant insect pests common to the area include Douglas-fir beetle (*Dendroctonus pedsotugae*) and western spruce budworm (*Choristoneura occidentalis*). Red ring rot fungus (*Phellinus pini* and *Phellinus schweinitzii*) and butt rot are common causes of stem decay. Western spruce budworm has been active in CCCP forestlands over the past decade. Pockets of Douglas-fir in Section 1 have experienced high levels of mortality; however, for the most part damage has been limited to survivable levels of defoliation. Budworm defoliation currently appears to be in decline in the area. *See the photo log in the appendix for Spruce budworm damage documented at photo points 12 and 13.*

Ponderosa pine is vulnerable to defoliation, stem decay and mortality from a variety of forest insects, diseases, and fungi. Significant insect pests potentially significant to the area include western pine beetle (*Dendroctonus brevicornis*), mountain pine beetle (*Dendroctonus ponderosae*), and pine engraver beetle (*Ips pini*). Red ring rot fungus (*Phellinus pini*) is a common cause of stem decay. Stem and branch damage is often the result of Western gall rust (*Endocronartium harknessi*) and Comandra blister rust (*Cronartium comandrae*). Mountain pine beetle has also been active in the vicinity of the CCCP property over the past decade. Beetle-killed ponderosa pine are scattered throughout sections 1 and 11. The most affected area is a pocket of large-diameter, beetle-killed ponderosa located where the corners of Sections 1 and 11 intersect. *See the photo log in the appendix for mountain pine beetle-killed ponderosa documented at photo point 18.*

Lodgepole pine is vulnerable to defoliation, stem decay and mortality from a variety of forest insects, diseases, and fungi. Significant insect pests common to the area include mountain pine beetle (*Dendroctonus ponderosae*) and pine engraver beetle (*Ips pini*). Stem and branch damage

is often the result of Western gall rust (*Endocronartium harknessi*) and Comandra blister rust (*Cronartium comandre*). Needle damage is often the result of Lodgepole pine needle cast (*Lophodermella concolor*). Red ring rot fungus (*Phellinus pini*) is a cause of stem decay. Mountain pine beetle activity in the past decade has resulted in extensive lodgepole pine mortality—particularly in the eastern portion of section 1. *See the photo log in the appendix for lodgepole pine mortality from beetle activity in section 1 documented at photo point 11.*

As discussed in the beginning of the forest health section, thinning is a viable management option for reducing the potential for insect and disease damage in the forests of the Clear Creek Conservation Project property. There are many other management activities which can be carried out to counteract forest pests. These options are typically specific to a particular damage-causing agent. Spruce budworm and mountain pine beetle are currently primary forest pests on CCCP lands. The following is an in-depth description of these insects as well as descriptions of management activities specific to their control.

Western Spruce Budworm

Western spruce budworm has been active in the CCCP property and surrounding forested lands over the past decade and defoliation is evident in the crowns of many Douglas-fir. Larvae consume needles and buds of Douglas-fir, subalpine fir, and Engelmann spruce trees. Most outbreaks of this insect are cyclical in nature and last only a few years; however, budworm infestations are becoming increasingly longer in Montana.



Western spruce budworm defoliation of Douglas-fir

Healthy Douglas-fir trees will typically survive repeated years of light infestations. When severe infestations occur over a several year period, stressed trees can be killed. Western spruce budworm larvae, which develop in the tops of trees, will often drop down onto smaller trees in the forest understory and cause severe defoliation. Where mature trees are heavily defoliated, it is likely that young trees below have been killed.

Identification

During July reddish brown branch tips will give trees a scorched appearance. The upper portion of the tree crown may appear bare or thin. Budworm larvae feed in buds and foliage from May-July. Older larvae have dark heads and an olive-brown body with whitish spots. Pupae cases are attached to damaged shoots. Orange to gray-brown moths less than an inch across are abundant in late July and August during an outbreak.

Recommendations to Reduce Risk of Defoliation by Western Spruce Budworm

Management practices recommended for controlling budworm infestations focus on encouraging a mixture of non-host tree species in a stand; thus, avoiding pure monocultures of a single host species. Silvicultural practices include maintaining or increasing tree diversity in vulnerable stands, thinning from below to create single story forest stand structures, and thinning to reduce inter-competition between trees to increase the vigor of retention trees. During thinning operations it is important to identify, protect and retain individual trees that exhibit resistance to defoliation, as these trees may have genetic traits to help them survive the effects of western spruce budworm.

Aerial Application of the Bt

The microbial insecticide *Bacillus thuringiensis* (Bt) is an organic product that can be aerially sprayed on forest areas to control western spruce budworm populations during outbreaks. Bt is a naturally occurring bacterium that must be consumed by the budworm larvae to cause mortality. The bacteria enter the blood of the insect causing full-scale infection and death of the insect within 3-5 days.



Aerial spraying for Spruce Budworm Control

Aerial application can be accomplished with fixed-wing aircraft or helicopters. The application must be timed with the emergence of new foliage and presence of feeding larvae to be effective. Generally, results are a decreased level of defoliation but not complete elimination. Reapplication of biological treatments will likely be required during the duration of the spruce budworm outbreak. Cost of aerial treatment can vary significantly but generally range from \$60-\$80 per acre.

Mountain Pine Beetle

Approximately a decade ago a severe epidemic of mountain pine beetle swept across the area of the CCCP. Many susceptible ponderosa pine and nearly all susceptible lodgepole pine on the property were killed as a result. The magnitude of the outbreak caused the beetles to eat themselves out of a host food source in a short period of time. Current mountain pine beetle populations are relatively low. However, mountain pine beetles remain as an endemic insect pest with mortality still occurring. As pine stands mature to susceptible size and density, the risk of an outbreak remains. Mountain pine beetle attacks all species of pine, including ponderosa, lodgepole, whitebark, and limber.



Lodgepole pine with pitch tubes

Identification

Adult beetles are about the size of a piece of rice and spend almost their entire life underneath the bark of a host tree. Beetles tunnel through the bark causing the tree to exude copious amounts of pitch. The resulting pitch tubes are telltale indication of a beetle attack. Needles of successfully attacked trees typically fade from green to yellow or red within 6-12 months.

Recommendations to Reduce Risk of Additional Mountain Pine Beetle Infestation

The best long-term approaches to reducing beetle caused mortality are to manage forest conditions to provide environments less attractive to mountain pine beetles. Thinning is beneficial. Beetles tend to avoid open forests that are warm and bright with more air movement. Maintaining lodgepole pine stands at basal areas of less 100 ft² of basal area per acre will reduce risk of severe infestation in stands with trees greater than 8 inches in diameter at breast height.

Removal of Trees Currently Infested with Mountain Pine Beetle (MPB)

Infested trees with green or yellowing foliage should be cut and properly disposed of before mid-May. Proper disposal methods would include removal from the property, burning, chipping and burying.

Deployment of Verbenone Pouches

Verbenone is a synthetic pheromone treatment that replicates the anti-aggregate pheromone that sends a message to other beetles that the tree is full and the food supply is insufficient to support additional beetles. Active MPB infestations may be mitigated for a period of time with the use of verbenone if the infestation is light and treatment is timely. Verbenone is not recommended if more than 20% of the forest stand is infested. Verbenone dispensers (pouches) can be deployed on individual trees or throughout a forest area on a grid pattern. Pouches are good for one season and must be reapplied each year. An even distribution of pouches throughout an area will blanket the area in a plume of repulsive pheromone. This is most often done with pouches set out in a grid pattern or along parallel lines. It is not absolutely necessary to have each pouch on a tree as vertical surfaces and non-host trees may be used to sustain the grid. Recommended density is 30-40 pouches per acre (30-45 foot spacing between pouches).

Silvicultural Approaches to Forest Management

Purpose and Scope

The management goals for this property can be achieved by the implementation of recommended silvicultural practices. This section introduces and describes the silvicultural approaches to forest management recommended for forest stand types present on the CCCP property. Potential limitations associated with various silvicultural approaches are also described.

Uneven-Aged Management

Natural plant communities develop through known successional pathways following disturbances. Disturbances such as catastrophic wildfire or timber harvest often set a large area of a forest plant community back to an early successional state. Less severe and more common disturbances, such as insect or disease infestation may affect only a single tree or a small group of trees, altering succession to a lesser degree. This process is often referred to as “Gap Succession”. Gap succession creates small openings in the forest canopy that provide space for a new age class of young trees to develop. This process increases complexity in forest stands by creating conditions that favor multiple tree species and multi-layered forest structures.

Ecologically, uneven-aged silviculture reflects a land manager’s effort to imitate naturally occurring patterns of plant succession and natural forest disturbance. The advantages of uneven-aged silviculture are that the stand’s structure, productivity, and cover are maintained over time.

Opportunities to simulate stand structures resulting from mountain pine beetle, western pine beetle and Douglas-fir beetle attacks exist in Douglas-fir stands which include a component of mature trees. Group selection harvesting is used to approximate intensive small-scale disturbances that create larger openings within a stand. Natural examples include localized insect infestation, windthrow, or flare-up of a surface fire.

Single tree selection harvesting mimics the smallest scale of succession such as when a single tree falls or dies. Causes of mortality may include lightning, disease, insects, and windthrow. In small gaps, the opening in the forest canopy may fill before regeneration can fully develop. This regeneration in the forest understory may stagnate and persist with little growth and will eventually become suppressed and die.

Gap size in the forest canopy is a critical link to successful regeneration of desirable tree species. Larger gaps favor species intolerant of shade such as lodgepole pine. Harvest unit layout can be done in a manner to vary opening size, shape, density and orientation to provide more natural landscape patterns in the forest. Residual basal areas of 40-90 square feet per acre after timber harvest will encourage conifer regeneration and limit vulnerability to insect and disease pests. Retention trees must be of sufficient size and maturity to be reliable seed bearers. Marking of designated leave trees in harvest units is recommended to ensure multiple age classes, variable tree sizes and healthy seed trees are well represented in treated stands.

Limitations

Steep slopes (greater than 40%) are a special challenge given the potential for mechanical damage to the residual stand during repeated harvest entries. Stands where canopy layers are stratified with intolerant species in the overstory and tolerant species in the understory require

intensive management to ensure adequate regeneration of shade-intolerant species. Dense, uneven-aged forest structures dominated by a single tree species can be vulnerable to western spruce budworm and dwarf mistletoe. Multiple stand entries in conifer stands where root disease is present can create conditions favorable for the spread of disease.

Even-Aged Forest Management

Montana's forest areas are subjected to many different fire regimes as the result of climate, topography and vegetation. The fire regime is specific to each area in regards to frequency, size and severity. Even-aged management is often recommended for forest types that experience mixed to high-severity fires. These regimes are most common at higher elevations where fires are less frequent and fuels build up over time. An even-aged harvest prescription is generally recommended for lodgepole pine stands in order to replicate historical conditions.

High elevation lodgepole pine/subalpine fir forests in the Rocky Mountains experience stand replacing fires at intervals of 75–300 years. These fires are less frequent but are often more severe, resulting in complete or nearly complete mortality in the stand. The outcome is the development of even-aged stands spread out in a mosaic pattern across the landscape.

Even-aged harvest methods may also be recommended to control insect and disease outbreaks, manage suppressed stands comprised of predominately low-vigor trees, create diversity in otherwise homogenous forest landscapes, and treat stands on moderately steep slopes which are prone to damage from multiple harvest entries. The method can also be used to salvage merchantable timber following a wildfire.

An even-aged silvicultural system is a planned sequence of treatments designed to maintain and regenerate a stand with one age class. Once tree regeneration is well established, intermediate treatments like tree thinning may be used to control stand stocking and species composition several times over the length of the rotation. Thinning is intended to stimulate the growth and vigor of trees by reducing the competition for light, water and nutrients. Thinning is most beneficial in young vigorous stands but may be used in areas with trees that have reached merchantable size.

The rotation length is the period of years required to grow a crop of timber to specified condition of economic or biologic maturity. There are three regeneration harvest methods used in even-aged systems: clear-cut, shelterwood and seed tree harvests. These methods vary by the residual stand left after harvesting and the purpose of these residual trees. Each method is designed to regenerate a new stand of shade intolerant tree species.

Clearcuts are a method of regenerating an even-aged stand in which a new age class develops in a fully exposed micro-environment after removal of all trees in the previous stand in a single cutting. Regeneration can be from natural seeding, direct seeding, planted seedlings and/or advance reproduction.

For a shelterwood harvest prescription, one or more cuttings are made to begin the development of a new age class before the old stand is completely removed. Partial shade from the residual

overstory provides protection to newly developing seedlings. This method is commonly used to encourage regeneration of Douglas-fir and ponderosa pine on drier sites and south aspects.

A seed-tree harvest is an even-age management system where only a few widely-spaced residual trees are maintained on site as seed sources. The seed-tree method is very similar to the shelterwood method, differing only in the amount of residual stocking left during harvest and the purpose of the residual overstory trees. In the seed-tree method, fewer trees are left on site and these residual trees serve only as a seed source (seed-trees). Foresters normally use the seed-tree method with light-seeded, wind-disseminated, shade-intolerant species such as western larch.

The choice of even-aged regeneration method will depend on both landowner objectives and the forest type under management.

Limitations

Clearcuts produce the most drastic changes to microclimate, wildlife habitat and aesthetics, and therefore may not be an attractive choice for areas where non-timber forest commodities are emphasized. If not properly planned, clearcuts can increase erosion, landslide and rapid runoff of water. The risk of this type of damage is greatest on steep slopes. Avoiding the use of clearcuts on erosive soils and utilizing appropriate harvest technologies such as cable and mechanical cut-to-length harvesting will protect soils and mitigate potential negative impacts. Historically, foresters have used shelterwood and seed-tree methods to provide alternatives to clear cutting. Most even-aged regeneration systems rely on natural regeneration, but in some cases artificial regeneration (planting or direct seeding) is used as a primary or supplemental source of regeneration.

Tree Thinning

Cutting of trees in a forest stand for the purpose of stimulating the growth and vigor of residual trees is known as tree thinning. Trees cut in a *pre-commercial thinning* have no commercial value and normally none of the felled trees are harvested. Trees cut in a *commercial thinning* have commercial value and are harvested for utilization as a wood product.

Tree thinning can be used to accomplish management objectives other than production of merchantable timber. Thinning can increase water yield from watersheds, enhance the development of forest understory vegetation for wildlife or livestock, improve aesthetics of forest stands, reduce fire hazard and improve tree growth rates, and improve resistance to insect and disease.

Thinning is the primary means by which the productivity of overstocked forest stands can be improved. Trees in dense stands struggle for existence and have reduced growth and vigor due to competition for light, water and nutrients. Reducing the number of trees per acre by removal of less desirable trees allocates available light, water and nutrient resources to the most vigorous trees on a site. Vigorous trees tend to occupy superior positions in the forest canopy and have more fully developed crowns. The position of a tree's crown in the forest canopy is an important criterion when deciding whether it should be cut or retained. Reducing competition for space in the forest canopy is significant since the tree's foliage produces the energy on which the tree

depends. Retention of vigorous dominant and co-dominate trees is generally recommended because these trees have crowns that receive sunlight from above and/or from the side.

Species composition is controlled when desirable trees species in good health are retained and less desirable species removed. Desirable tree species will be adapted to the growing conditions on the site and most capable of utilizing available resources. Determination of which tree species are most desirable on given sites will depend on several variables. These variables include insect and disease resistance, fire resistance, drought tolerance, shade tolerance, soils, and local markets for wood products. Where saw-timber production is the primary objective, the focus of tree thinning is to ensure that crop trees develop vigorous crowns and straight stems with smaller braches.

The selection of trees to be favored and of those to be cut is based not only on the relative position and condition of the crown, but also on the health of the tree, genetic attributes of the tree, and condition and quality of the tree bole. Removal of genetically inferior trees will improve the genetics in a forest over time. Undesirable tree species can be targeted for removal from stands during thinning operations and the composition of species within a stand can be controlled to meet various forest management objectives.

Reductions in stand density accomplished by thinning usually encourage faster tree diameter growth and increase the proportion of stem wood large enough for profitable use over time. It may take a period of several decades following a thinning for the stand to reach full occupancy of the site. The beneficial effects of thinning are especially significant in areas where soil moisture is limited during the growing season.

If live crown ratios of potential crop trees within a stand begin to fall below 30-40% thinning is recommended to prevent a reduction in tree growth rate and tree vigor. Pre-commercial thinning is especially important in very dense young stands. These stands are likely to stagnate without early treatment. The ability of trees to release in stagnated stands decreases with age. Every effort should be made to thin dense stands of young trees at an early age.

Typically, pre-commercial thinning can occur once differentiation of crown classes has occurred. Basal area targets can be developed for stands that are predominately comprised of merchantable-sized trees. Basal area is a measure of stand density expressed as square feet per acre of tree stem cross sections measured at a point 4.5 feet from the ground. Basal area per acre is easily measured with a timber cruise or field inventory. Once a stand exceeds a recommended upper limit of basal area per acre, a reduction in basal area is likely required to improve or maintain growth rates of residual trees. The basal area of the stand can be reduced to a pre-designated lower basal area per acre limit and then allowed to grow back over time to the upper limit or threshold value. Once the upper basal area limit is achieved, the stand can be re-evaluated for harvest or repeated thinning.

The range of optimum tree stocking rates and basal area for a stand will vary by site, stand age, tree size class distribution, and tree species composition. Low productivity sites will have a lower optimum tree stocking rate than moderate to high productivity sites.

The advantages of tree thinning are less pronounced in stands comprised of mature trees. The sudden exposure of trees in dense stands can make them vulnerable to windthrow. Trees in dense stands may have poorly developed root systems. Shallow rooted species such as lodgepole pine and Engelmann spruce are especially vulnerable to windthrow in heavily thinned areas.

Several thinning methods can be utilized to accomplish different management objectives. Late summer and fall are generally the best time to implement tree thinning. Trees are less susceptible to bark damage at this time, and slash generated from the thinning has less potential to attract bark beetles.

CCCP Forest Stand Type Classifications and Management Recommendations

Forests on the CCCP ownership were delineated into forest stands utilizing 2013 National Agriculture Imagery Program (NAIP) aerial photography. Forest stand boundaries were verified and adjusted during field reconnaissance conducted in October of 2014. Forest stands are delineated to stratify the forest ownership for management purposes. The CCCP property's wide elevation span, variety of slope aspects, long history of logging and recent insect outbreaks combine to create a highly variable mosaic of forest stand types. Stands are described by dominant tree species, dominant size class present in the overstory, and stocking levels. The following ID codes are used to develop stand type descriptions for the subject property.

ID Code Dominant Species

DF	Douglas-fir
PP	ponderosa pine
LP	lodgepole pine

In stands which contain multiple dominate species, the more prevalent is shown first ex. LP/DF.

ID Code Dominant Overstory Size Class

1	Seedling/Sapling
2	Pole
3	Saw timber

For purposes of forest stand classification seedlings are defined as trees between 1 and 4.5 feet in height. Saplings are trees greater than 4.5 feet in height and less than 5 inches in diameter. Poles are trees with a diameter at breast height (DBH) of 5 to 8 inches. Sawlogs have a DBH of 8 inches and greater. Forest stands with less than 1.0 mbf per acre are classified as either seedling/sapling or pole stands.

ID Code Tree Stocking Rates

Seedling/Sapling Stands

L	0-150 seedlings/saplings per acre
M	150-400 seedlings/saplings per acre
W	400 or greater seedlings/saplings per acre

Pole Stands

L	1-74 poles per acre
M	75- 150 poles per acre
W	Greater than 150 poles per acre

Sawlog Stands(mbf = one thousand board feet)

L	1.0-2.5 net mbf per acre
M	2.5-4.0 net mbf per acre
W	greater than 4.0 net mbf per acre

Stands with less than 1.0 mbf per acre are classified as either seedling/sapling or pole stands

Stand Classification Examples

DF/3/L = Douglas-fir stand, sawlog-sized timber, 1.0 to 2.5 mbf per acre (low net volume)

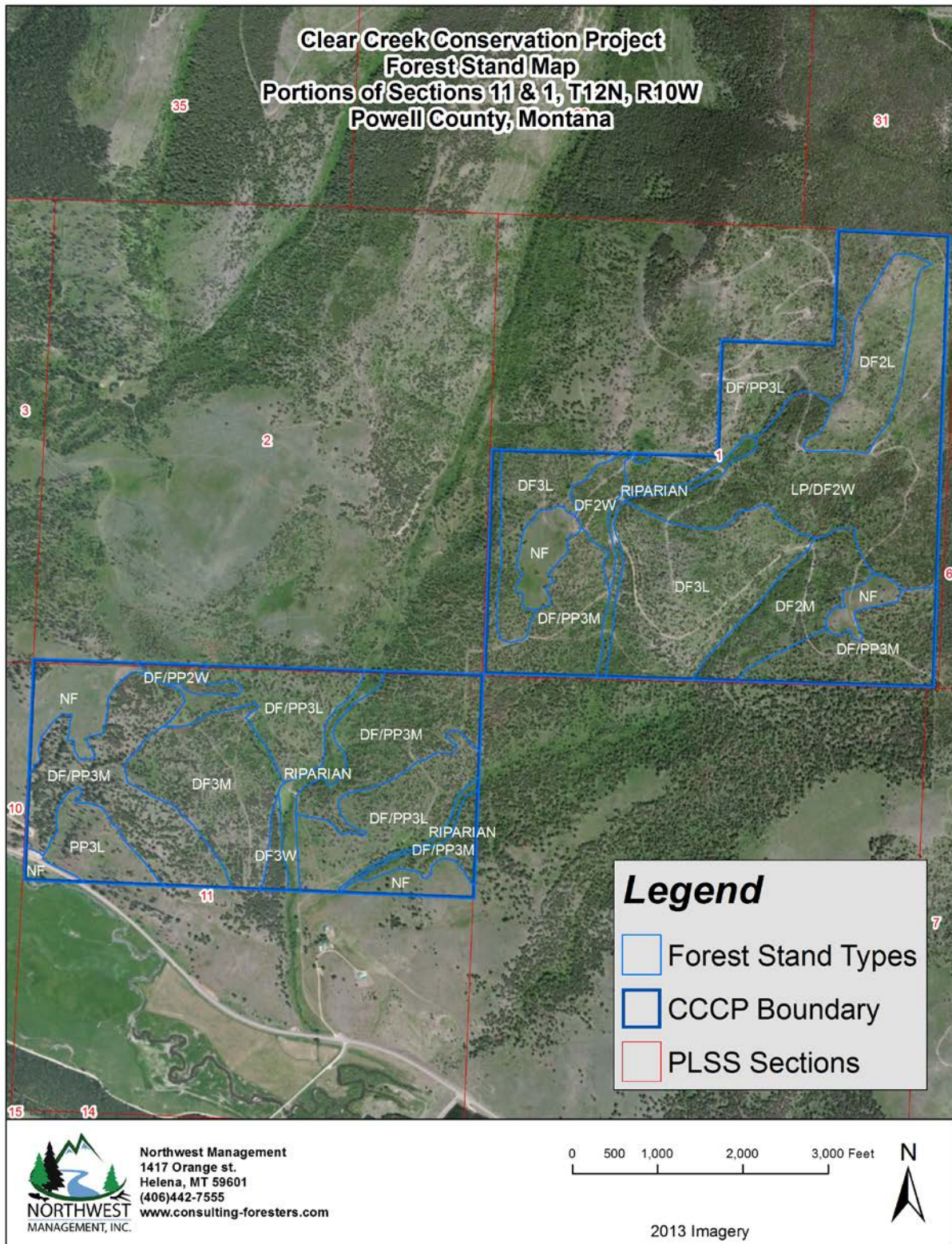
DF/2/W = Douglas-fir stand, pole-sized timber, well stocked (greater than 150 poles per acre)

Stand Description and associated acreage is identified in the following table.

Table 3: Total Acres by Stand Type

Stand Type	Total Acres
DF3W	4.3
DF3M	51.6
DF3L	99.7
DF2W	10.7
DF2M	33.3
DF2L	33.5
DF/PP3M	186.6
DF/PP3L	115.7
DF/PP2W	5.4
PP3L	19.1
LP/DF2W	124.5
Non-Forested (NF)	53.2
Riparian	23.4

CCCP Forest Stand Type Map



General Description of Forest Stands

Douglas-fir is the dominant tree species across most of the CCCP ownership. Ponderosa pine is present in most stands but is rarely the dominant tree species. On higher elevation, wetter sites present in Section 1, lodgepole pine supersedes Douglas-fir as the dominant tree species. Quaking aspen is also present in riparian drainage bottoms but is limited in abundance.

Characteristic forest understory vegetation includes common snowberry, pinegrass, elk sedge, heartleaf arnica, white spirea, Rocky Mountain Maple, Oregon grape, serviceberry, wild rose and native grasses. Common forest habitat types are Douglas fir/snowberry, Douglas fir/twinflower, and Douglas fir/ pine grass. These habitat types tend to be moderately productive for timber production.

Extensive commercial timber harvesting has occurred across the property over the past several decades. Past harvest methods included clear cutting, commercial thinning and shelterwood cuts. These harvests removed mature sawlog-sized trees with ground-based mechanical logging machinery on moderate slopes and cable based logging systems on steep slopes. Old growth, large-diameter, ponderosa pine and Douglas-fir are very scarce. Contiguous areas of mature closed canopy forest are mostly absent. Forest stands generally include open overstories of second growth Douglas-fir with understories of sapling, seedling and pole-sized Douglas-fir or even-aged stands of conifer regeneration in old clear cut areas. Ample conifer regeneration is present in most areas.

Forest Stand Type Descriptions and Management Recommendations

DF/3/W = Douglas-fir stand, sawlog-sized timber, greater than 4.0 net mbf per acre.

Stand Description

Due to a history of repeated logging entries on the CCCP property, well stocked, sawlog stands of this type are very uncommon. This designation only exists on a single, 4.3-acre stand in Section 11. It is likely that the only reason logging was limited in this stand is because of the physical limitations of the site. It is situated on a steep, 35%-50% eastern-facing slope. Chicken Creek lies at the immediate toe of the slope, so any harvesting would require either crossing the stream or adversely hauling logs uphill.

This stand is composed of sawlog and pole-sized Douglas-fir with a minor component of ponderosa pine. Douglas-fir is in fair to poor condition due to spruce budworm defoliation and competition due to overcrowding. There are also indications of root disease in some Douglas-fir on the southern end of this stand. The ponderosa pine component of this stand is only in fair to moderate condition as it is losing out in resource competition with the more understory-tolerant Douglas-fir. Some snags are present as well as moderate amounts of down woody debris on the forest floor.

Management Recommendations

No immediate action is particularly necessary or feasible in this stand. Spruce budworm, which has been damaging Douglas-fir in the upper canopy, currently seems to be in decline and stem exclusion in the lower canopy strata is naturally killing off some of the overstocked and suppressed pole-sized trees. A commercial thinning is recommended to occur within the next 20 years. The harvest prescription should focus on removing diseased or low-vigor trees, creating a multi-layer canopy structure, maintaining ponderosa pine and retaining all snags for wildlife habitat.

DF/3/M = Douglas-fir stand, sawlog-sized timber, 2.5-4.0 net mbf per acre.

Stand Description

This forest stand type is represented by a single, 51.6-acre stand in Section 11. Slopes are relatively steep, ranging from 30% to 60%; with predominately east and northeast aspects. On these slope aspects, which are relative cooler and wetter than most aspects on the CCCP property, shade-tolerant Douglas-fir dominates the site. Ponderosa pine is minimally represented. The condition of stumps and age of regenerating trees indicates that commercial logging, which has shaped the current structure of the stand, occurred within the past 25 years. Presently, the stand is composed of a scattered overstory of Douglas-fir sawlogs and poles in fair biological condition. Large-diameter trees are mostly absent from the stand. Spatially, the stand has a patchy structure with small 1/10th to 1/100th acre gaps interspersed throughout. These small openings often contain grass as well as thickets of sapling-size regeneration and dense patches of ninebark and snowberry.

Management Recommendations

No immediate management actions are recommended for this stand. The current structure provides sufficient growing space for overstory Douglas-fir. Thickets of regenerating trees, although overstocked in places, provided valuable forage and cover for wildlife as well contributing to the mosaic of habitat available to wildlife on the CCCP property.

In 20-30 years, a commercial/non-commercial thinning project should be undertaken. In addition to providing revenue from the sale of timber, the project should aim to promote large-diameter trees, encourage ponderosa pine, maintain small gaps and openings and favor an open, multi-layered forest structure. Large, mature trees should be selected and marked for retention with ladder fuels and competing tree crowns reduced and removed based on these trees. Sapling and pole-sized regeneration should be thinned to a density of not more than 300 trees per acre. All harvesting and cutting should focus on retaining high-vigor trees in good biological condition, which represent a variety of size and canopy classes. Preferential retention of ponderosa pine in this stand will increase overall tree species diversity.

DF/3/L = Douglas-fir stand, sawlog-sized timber, 1.0-2.5 net mbf per acre.

Stand Description

This stand type occurs on steep, 40%-60% slopes with thin, rocky soils on portions of Section 1. Overstory trees are widely scattered and in poor biological condition. The current condition of this stand type is attributable to past timber harvest activities which likely occurred more than 30 years ago. These stands were heavily logged with little consideration for the retention of trees in good biological condition and with favorable genetic traits. Tree regeneration is limited, but where it is present, it is in good condition. This stand currently offers little hiding or thermal cover for wildlife. However, understory plant communities do provide wildlife with good sources of forage and browse. On eastern and western-facing slopes, shrubs such as Rocky Mountain maple are growing amongst regenerating Douglas-fir in the understory. On southerly slopes a more range-like understory exists. In these areas bluebunch wheatgrass, Idaho fescue, rough fescue and sagebrush provided potential food sources for grazing wildlife. Likely encouraged by the wide-spread ground disturbance from logging on this steep ground, spotted knapweed is also pervasive in these stands. These stands also have a relatively high road density as a result of logging; spotted knapweed is well established along these roads.

Management Recommendations

Little can or should be done for the forest component of this stand at this time. Overstory trees are of low merchantable value and are amply spaced to avoid inter-tree resource competition. Tree regeneration is occurring but at densities low enough that a pre-commercial thinning or other treatment likely would not be necessary for several decades.

A management recommendation for the understory in this stand is to manage knapweed and hound's tongue in heavily disturbed areas with herbicide applications. Treatment areas should include roadsides and any other areas where excessive soil disturbance has occurred. This would decrease further spread of these weeds by wildlife and people and increase the health and abundance of native grasses and forbs.

DF/2/W = Douglas-fir stand, pole-sized timber, Greater than 150 poles per acre.

Stand Description

This stand type is represented by a single, 10.7-acres stand in Section 1. It is situated on an east to south-east facing aspect with slopes of approximately 40%. The stand appears to have been clearcut 25 to 30 years ago. Old logging roads are still in usable condition and provide good access to all portions of this stand.

Past logging initiated the establishment of the present cohort of trees on the site. Currently the stand is densely overstocked with sapling and pole-sized Douglas-fir in good biological condition. There is also a very sparse representation of ponderosa pine within the stand.

Management Recommendations

There are only a few stands within the CCCP property that would benefit from immediate forest management activities; this stand is one of them. The densely spaced trees in this stand are healthy and vigorous. However, they are reaching a point at which inter-tree resource competition is beginning to have a deleterious effect on tree growth and overall stand health.

A pre-commercial thinning project is recommended for this stand. Trees in this stand are still small enough that a hand crew could be utilized for the thinning and slash from the project could simply be lopped and scattered on site. Thinning guidelines should achieve a spacing of 12 to 15 feet between trees (approximately 200 to 300 trees per acre) and should favor the retention of the healthiest trees in dominant crown classes. Any ponderosa pine should also be retained in order to maximize tree species diversity within the stand. With forester supervision, a thinning project of this nature would cost approximately \$450 to \$500 per acre to complete.

DF/2/M = Douglas-fir stand, pole-sized timber, 75- 150 poles per acre.

Stand Description

This stand type occurs on a 33.3-acre stand in Section 1 with 40% to 60% slopes on a northwest-facing aspect. It is very similar to stand type DF/3/L in that it is a relatively poor growing site with thin, rocky soils and has a current stand structure which is a result of past logging activities which removed mature, overstory trees. Unlike stand type DF/3/L, this stand lacks enough sawlog-sized trees to meet the minimum timber volume threshold for a sawlog stand designation. It is composed of a patchy overstory of pole-sized Douglas-fir in poor biological condition. The

understory consists of shrubs, pinegrass and scattered thickets of 2 to 5 foot tall Douglas-fir regeneration in good biological condition.

Management Recommendations

No active forest management is recommended for this stand at this time. Western spruce budworm and other potential damage-causing, forest insects should be monitored to ensure that regenerating trees continue to grow and successfully establish within this stand. In 20 to 30 years, when regenerating tree density necessitates it, a pre-commercial thinning project should be undertaken to thin pole-sized trees to a spacing of at least 15 to 20 feet between trees to maintain tree vigor and ensure the recruitment of a health cohort to occupy the overstory in the future

DF/2/L = Douglas-fir stand, pole-sized timber, 1-74 poles per acre.

Stand Description

This stand type exists on a 33.5-acre stand in northeastern portion of Section 1. It is situated on 40% - 50%, south and southeast-facing slopes and encompasses the highest elevations on the CCCP property. Soils are thin and rocky; it is a relatively poor site for tree growth. Stumps indicate that large-diameter Douglas-fir were once found throughout this stand. However, following a clearcut harvest, the stand is now occupied by scattered pole and sapling-sized Douglas-fir in fair biological condition. Due to the relatively harsh growing conditions, lack of an overstory seed source and an understory dominated by well established beargrass, conifer regeneration is scarce. Road access is limited to this stand, and it is situated on the most remotely located portion of the CCCP property.

Management Recommendations

No active forest management is recommended for this stand at the time.

DF/PP/3/M = Douglas-fir/ponderosa pine stand, sawlog-sized timber, 2.5-4.0 net mbf per acre.

Stand Description

This stand type is present on 186.6 acres of the CCCP's forested lands making it the most well represented stand type on the property. Typically slopes are relatively gentle and range from 10% to 35%. These stands are generally situated on more southern-facing slopes that favor the increased representation of ponderosa pine which is well suited to grow on hotter, drier exposures. As with most other areas of the CCCP, past logging activities are the major driver of the current stand structure. Currently these stands are composed of an open overstory of sawlog-sized Douglas-fir and ponderosa pine. High grading during previous logging entries and recent spruce budworm defoliation has left Douglas-fir in the overstory in only fair biological condition. With the exception of a pocket of mountain pine beetle mortality in the northeast portion of Section 11 and southwest portion of Section 1, overstory ponderosa pine is generally in good biological condition.

Understory vegetation in this forest type varies greatly by site. The DF/PP3M stand type in the western portion of Section 11 is considerably drier than similar stands in Section 1 and the eastern portion of Section 11. This is driven primarily by aspect and elevation. On drier sites,

tree regeneration is very limited and the understory is composed mostly of native grasses. On wetter sites, regeneration is well stocked, vigorously growing and in good biological condition.

Management Recommendations

On the drier DF/PP3M stand type in western portion of Section 11, no immediate management action is necessary. Past logging entries effectively thinned the overstory trees to a desirable spacing while maintaining occupancy of the site. Where grass dominates the understory, regenerating trees are not overstocked and thinning projects should not be necessary.

On the wetter DF/PP3M stand types overstory conditions are similar and require no immediate attention. Understory conditions, however, are beginning to reach the point where a pre-commercial thinning project would be beneficial for maintaining both individual tree vigor and the over health of the younger age class cohort. On this ground thinning could be accomplished through the use of a hand crew or mechanical mastication. In order to minimize inter-tree competition, horizontal crown continuity and ladder fuels, target spacing should be at least 12 to 15 feet between regenerating trees with at least 25 feet of clearance from overstory trees. Leave-tree selection should also focus on increasing the relative abundance of regenerating ponderosa pine in the understory.

DF/PP/3/L = Douglas-fir/ponderosa pine stand, sawlog-sized timber, 1.0-2.5 net mbf per acre

Stand Description

The forest stand type is represented by two separate stands in Section 11. These stands are situated on gentle slopes averaging 20% to 30% along dry, south-facing aspects. Their structure is the result of past logging entries which removed significant portion of the large-diameter trees from the overstory. The result is an open, mixed-species, multi-layered stand. The overstory is comprised of sawlog-sized Douglas-fir in fair to good biological condition and ponderosa pine in good biological condition. Healthy, pole and sapling-sized regeneration make up the lower layer of the open forest canopy. This regeneration is clumpy, and in many areas the understory is composed of only grasses and shrubs such as snowberry. Spotted knapweed is present throughout this stand type. Spruce budworm defoliation is light within this stand and appears to be in decline. There is an adequate amount of woody debris on the forest floor and many fire-charred snags scattered throughout this stand. In general this forest stand type is in good condition.

Management Recommendations

The only immediate management activity recommended is herbicide application to control spotted knapweed within the understory and curtail its spread in to uninfested areas of the CCCP property.

In 20 to 40 years, a commercial thinning operation should be undertaken on the trees which are currently pole and sapling-sized regeneration. The silvicultural prescription for a commercial thinning should maintain an open structure in the stand by creating small, 1/4 to 1/2 acre openings in which understory vegetation and new tree regeneration can establish. Ponderosa pine should be favored as fire-adapted species that is well suited to this site. To the extent safe operations permit, large-diameter snags should protected during any harvesting operations.

DF/PP/2/W = Douglas-fir/ponderosa pine stand, pole-sized timber, Greater than 150 poles per acre.

Stand Description

This stand type is represented by a single 5.4-acre stand on the northern boundary of Section 11. The slope is gentle to flat with an overall southeast-facing aspect. This stand is comprised of a dense thicket of 3 to 5 inch DBH, 10 to 15 foot-tall Douglas-fir and ponderosa pine poles and saplings. There has been substantial mountain pine beetle mortality in ponderosa pine component of this stand, but, in general, the surviving trees are in good biological condition. The understory plant community is composed of native grasses and sagebrush. Antler rubs, deer and elk droppings as well as evidence of bedding areas were observed on the site visit and provided evidence that this stand is frequently used by wildlife.

Management Recommendations

From strictly a forestry standpoint, this stand is overstocked and is a good candidate for a pre-commercial thinning project. However, with wildlife habitat as a key management consideration, this stand serves the management objective of the CCCP property well in its current condition. Overcrowding will cause increasingly high levels of inter-tree competition and some tree mortality within this stand. In its current condition it will continue to provide valuable thermal and hiding cover for elk and deer and contribute to the diversity of habitat on the property.

PP/3/L = Ponderosa pine stand, sawlog-sized timber, 1.0-2.5 net mbf per acre.

Stand Description

This is the driest forest stand type found on the CCCP property. It is represented by a single, 19.1-acre stand in the western portion of Section 11. It is situated on 20% to 35% slopes on a south-facing aspect at the toe of the foothills just above the valley floor. This stand contains scattered, large-diameter ponderosa pine in good biological condition. The understory consists of primarily native bunchgrass, fescue and sagebrush. Regeneration is scarce and sporadically dispersed throughout the stand. Spotted knapweed is established throughout the stand and hound's tongue is present along disturbed roadsides.

The grassland plant community provides grazing opportunities for elk and deer in their winter range. Mature, large-diameter ponderosa pine provide important wildlife habitat both as live trees and as sources of future wildlife snags.

Management Recommendations

This stand should be managed for its range component as well as its forest component. Herbicide treatment to eradicate hound's tongue and reduce the abundance of spotted knapweed is recommended to improve and conserve the rangeland resources of this stand. It is also recommended that tree regeneration be controlled through periodic cutting. This regeneration is considered forest encroachment onto rangeland. Periodically removing it emulates the frequent, low-intensity disturbance regime that would naturally maintain this stand in an open ponderosa pine savannah.

LP/DF /2/W = Lodgepole pine/Douglas-fir, pole-sized timber, Greater than 150 poles per acre.

Stand Description

This stand type covers 124.5 acres and represents a large portion of the wetter aspects at higher elevations in Section 1. Slopes vary from flat to relatively steep at 40% to 50%. Unlike most of the ground on the CCCP property the slope aspect of this stand type is predominately north-facing. Twinflower grows in the understory of this stand and is a key indicator species of the moister environment which is capable of supporting lodgepole pine as a dominant tree species. The even-aged structure of the stand and stump evidence suggests that much of this forest type in its current condition is a result of clear cutting in the past. Clearcuts, as a form of even-aged forest management, can be an appropriate and effective management regime for lodgepole pine forests. It emulates the natural, stand-replacing fire disturbance regime to which lodgepole pine are adapted. Indeed, the trees within this stand seemed to have responded well to past logging and are currently in good biological condition and growing vigorously. The exception to this is the pockets of lodgepole pine mortality resulting from the recent mountain pine beetle outbreak in the area. However, when compared to adjacent, uncut lodgepole pine stands to the east the mortality is relatively light.

Nearly all portions of this stand are adequately stocked with pole-sized regeneration. Some areas, particularly along the central eastern boundary of Section 1, are overstocked. Lodgepole pine and Douglas-fir are well represented and ponderosa pine is interspersed throughout.

Management Recommendations

There is insufficient merchantable tree volume to support any commercial thinning or harvesting operations at this time. The immediate goal for this stand should be to continue establishing a healthy cohort of trees with a diverse representation of tree species. This should be accomplished by pre-commercial thinning projects being undertaken in the overstocked portions of this stand. Trees should be thinned to a minimum spacing of 12 to 15 feet with an emphasis on retaining trees with full, dominant crowns from all tree species present on the site.

The long-term goal for this stand should be to create a mixed-species, multi-aged forest through commercial harvesting and thinning in future.

Resource Category II: Wildlife Habitat

Wildlife habitat concerns are often best addressed by emulating the natural disturbance regimes that have shaped forest habitats over the past several centuries. It is important to understand the habitat requirements of specific wildlife species and manage for conditions that provide the necessary critical habitat components. In some instances forest management practices must be modified to achieve wildlife related objectives. Especially important forest wildlife habitat components include large diameter, dead, standing and down trees; riparian shrubs, aspen stands and native bunchgrasses and shrubs. Availability of hiding and thermal cover should be considered at both the landscape and stand level. Multi-layered forest structures generally provide habitat for the widest array of wildlife species. However, some species will favor dense single stand structures. Forest landscapes, which provide an assortment of vegetation types, will attract the greatest array of wildlife species.

Improving and maintaining winter range for elk and mule deer is a primary management goal for the CCCP. Understory shrubs and accessible Douglas-fir branches with needles and lichen provide browsing mule deer a food source during harsh winter months. Maintain and improving rangeland production of the intermountain grasslands found throughout the CCCP will ensure the persistence of a critical food source for elk and deer in their winter range.

Wildlife Habitat Management Considerations for Upland Forests

Snags

About one-third of forest wildlife species are dependent on snags (standing dead trees) and coarse woody debris (down logs and trees). More than 60 of these species use cavities (holes excavated in trees) created primarily by woodpeckers for denning, nesting, and shelter. Most cavity nesters prefer the harder and larger diameter snags; those that are in the earlier stages of decay. The taller and larger diameter snags benefit more species, for a longer period of time, than the smaller snags. However, small diameter and shorter snags (including stumps at least 3 feet in height) are also utilized for feeding and cover. Snag dependent wildlife also use live trees with substantial amounts of decay. This includes broken tops, large dead and/or broken branches, cracked or damaged boles, heart rot, and mistletoe and rust brooms. Brooms (clumps of deformed branches) caused by these pathogens are readily used by platform nesters such as hawks, owls, eagles, and ospreys and as shelter for mammals such as squirrels and pine martens. Most wildlife species that use snags will use trees with substantial decay. Many of these defective trees will last for long periods of time and although they have little economic value, they have excellent value to snag-dependent wildlife.

Maintenance or creation of 5-15 snags per acre (dead, standing trees) will increase the use of the forested portion of the property by a number of wildlife species. Snags are utilized by wildlife for nesting, denning, perching, roosting, resting and feeding.

Snags and snag recruits should be identified and marked prior to timber harvests. Trees with low economic value that contain obvious defect should be retained wherever possible snag recruits. Snags can be created from conifers by girdling at the point of desired breakage, with a chainsaw, or with a mechanical harvester at time of tree harvest. Snag replacements should be as large in diameter and height and possible. A range of diameters is desirable, with a minimum size of ten

inches diameter at breast height (DBH). Snags that exceed 20 inches DBH are highly desirable. A mix of species will diversify use and stagger retention time. Retention of recruitment snags (dead or dying trees), will ensure a consistent, long-term supply of snags on the property.

Tree species preferred for snag retention or replacement include (most preferred listed first):

- 1) Quaking aspen
- 2) Douglas-fir
- 3) Ponderosa pine

Coarse Woody Debris

Coarse woody debris (down logs) goes through a similar decay cycle and use pattern as snags. The larger diameter and longer length hard logs last longer and are used by more wildlife species than the smaller and softer pieces of coarse woody debris. Ideally, these two components should be scattered throughout forested stands. Management practices that retain dead and dying large diameter trees are encouraged, especially near riparian areas.

Retaining at least 15 tons per acre of downed logs (coarse woody debris) throughout the forest unit will increase wildlife use. Species present on the property likely to use the downed logs include bears, woodpeckers, squirrels, voles, reptiles and amphibians. Follow the same basic guidelines for species, lengths and diameters as those listed above for snags.

Large treetops and butt ends that are bucked during harvest can be retained for coarse woody debris. This component can also be created from poor quality trees that are at least 20 feet long and at least 10 inches in diameter at the small end. When small amounts of blowdown occur between harvests, consider leaving a portion of the individual tree or large pieces of trees for wildlife.

Understory Vegetation

Understory vegetation consists primarily of grasses and forbs in sunnier locations, shrubs increase in abundance where sufficient soil moisture and sunlight are present. Some conifer regeneration is also included this habitat category. Many bird species utilize understory vegetation for nesting, foraging and cover. Maintenance of tall shrubs and grasses in forest stands and near riparian areas will improve bird habitat. Mammals use this habitat feature for food, shelter, and cover. Grasses and forbs provide cover and food for small mammals such as mice and voles. Bunchgrasses, many forb species and several shrub species are preferred forage for elk and deer. Tall shrubs provide valuable wildlife habitat and should be retained where possible by maintaining the forest openings in which they tend to be located. Understory vegetation will tend to decrease in abundance where the forest canopy cover exceeds 40%.

Forest Openings

Forest openings provide habitat features not found throughout dense forest stands. Forest tree canopies provide deep shade, catch and divert rainwater, intercept snow and deposit branch and leaf litter on the forest floor, acidifying soils. These and other factors can inhibit grass, forb and shrub production.

Creating and maintaining forest openings reduces competition for sunlight and increases in on-site rainfall, provide growing conditions that favor grasses, forbs and shrubs. In addition, the

partial shade found in these openings tends to moderate temperatures and retains soil moisture on site. Seed production is generally increased and insect populations thrive, providing food for small mammals and birds. The edges created by the contrast between the forested area and the opening provide additional habitat for a diverse array of wildlife species.

During thinning operations use of a variable density-thinning pattern can be utilized to mimic natural disturbance patterns. Some patches (at least 50 feet in diameter) can be thinned to a wider spacing to favor development of shrubs and ground cover. Other areas or patches (also at least 50 feet in diameter) can be thinned very lightly or not at all to retain shelter and cover for wildlife. These variable density units can be scattered throughout the landscape. Standing dead trees (snags) that do not pose safety problems should also be retained to the extent possible for the benefit of wildlife.

Uneven-aged Forest Management

Uneven-aged forest management is encouraged over the long term to develop and maintain diverse forest structures that include multiple tree age classes and increase the abundance of large diameter trees. Multi-layered forest stand structures are desirable in areas containing old growth large diameter trees. Uneven distribution of the overstory trees will lead to a diversity of understory plant species, providing a wide variety of potential sources of food for wildlife. These stands can be maintained over the long term with selective thinning treatments.

Management Recommendations for Wildlife Habitat in Upland Forests

- Create and maintain forest openings
- Maintain snags
- Retain downed logs
- Maintain or improve native understory vegetation
- Encourage multi-layered forest structures with uneven-aged management

Wildlife Habitat Management Considerations for Riparian Areas

Wildlife habitat management is especially significant in and near riparian areas and wetlands due to the dependence of many wildlife species on these habitats. Timing of management actions should be considered to reduce impacts to wildlife at critical times of the year such as breeding, nesting and birthing seasons and winter months when animals may be stressed. Riparian and wetland areas typically occupy a small percentage (less than 5%) of the landscape but are important islands of biological diversity and are ecologically significant. Healthy riparian and wetland sites provide critical habitat for many wildlife species. Elk wallows and scraped alder were observed in abundance at the head of the riparian zone in Section 1 during the field visit.

Riparian vegetation also shades streams and keeps water temperatures cool improving habitat for fish and aquatic invertebrates. Riparian vegetation provides a vast majority of the organic matter necessary to support aquatic communities. Management of riparian/wetland plant communities requires special planning to address all the resource values associated with riparian and wetland plant communities.

Management Recommendations for Wildlife Habitat in Riparian Areas

- Maintain shrubs in riparian areas. Shrubs provide food and cover for numerous wildlife species. Shrubs species provide excellent erosion control along streams.
- Maintain a healthy buffer strip of riparian vegetation adjacent to streams and wetlands. Buffer strips reduce sedimentation, stabilize streambanks, and slow flood waters.
- Retain snags and broken top trees for cavity nesting wildlife where they do not present a safety hazard.
- Avoid locating structures and roads in riparian and wetland areas.
- Retain streamside trees and shrubs for thermal cover, debris recruitment, and streambank stability.
- Adhere to Streamside Management Zone Law and implement Forestry Best Management Practices when conducting commercial timber harvest operations.

Wildlife Habitat Management Considerations for Intermountain Grasslands

There are several non-forested, grassy parks in Sections 1 and 11 of the CCCP. These are known as intermountain grasslands. As is well known by elk hunters and enthusiasts in Montana, these areas are hot spots for elk activity. Elk congregate and graze in these areas. During rut, bulls use intermountain grasslands to herd their harems together, and they are often the site of antler-locking confrontations between rival bulls. During winter these areas provide a critical winter range food source. During a second field visit in December a herd of over 50 elk was observed in an intermountain grassland on the Nevada Lake WMA which abuts the CCCP to the southeast.

Intermountain grasslands are ecosystems typically composed of a four above-ground layers. The uppermost is the shrub layer. This layer is not always present. Where it is present in the CCCP grasslands, it composed mostly of sage brush. The next layer is composed of tall bunchgrasses and herbaceous forbs. Common in this layer on the CCCP are native bunchgrasses such as bluebunch wheatgrass, rough fescue and Idaho fescue as well as forbs such as yarrow and lupine. Spotted knapweed is present in this layer and is established in most CCCP grasslands. Below this layer is a third layer composed of shorter bunchgrass and an even wider variety of forbs including a multitude of native wildflowers. This plant layer is susceptible to the establishment of invasive cheatgrass in disturbed grasslands. The lowest and final layer is the mat of lichens, mosses and algae which form a biotic crust over the soil. It is also know as a cryptogamic crust. This layer is perhaps the most sensitive, functional and irreplaceable component of an intermountain grassland. The biotic crust holds soil together between bunchgrass stools, locks in soil moisture, protects against surface erosion and, by virtue of firmly occupying the growing space between plants, provides a barrier against the establishment of invasive weeds. This layer contains a vast assemblage of species and forms over the course of centuries. It is sensitive; trampling by humans, livestock or wildlife can break the barrier created by the biotic crust and greatly diminish its ecological function. Heavier disturbance by vehicles, equipment or road construction can destroy it entirely. Unlike the other layers of intermountain grassland ecosystems which can recover with proper management, once this layer is lost it will not recover on a timescale appreciable to land management activities.

Conifer encroachment also threatens the long-term viability of these grasslands. Climatic changes and the absence of frequent, low-intensity fire are allowing trees to grow where they historically have not. Unchecked, this could eventually cause grasslands to convert to forest.

Management Recommendations for Wildlife Habitat in Intermountain Grasslands

- Restrict any road building or other construction within intermountain grasslands.
- Prohibit off-road vehicle use and minimize equipment use with intermountain grasslands.
- Do not locate logging slash piles within intermountain grasslands.
- Counteract conifer encroachment with periodic removal of trees infringing in to grasslands.
- Prevent unauthorized livestock grazing by periodically checking fence lines abutting private property.
- Develop a long-term weed strategy of chemical or biological controls to reduce the abundance and prevent the further spread of noxious weeds.

Resource Category III: Soils

Numerous soil types are present on the subject property. A summary of each soil type and its corresponding attributes are described in the table below. Soils descriptions and reports were obtained from the USDA Natural Resource Conservation Service Web Soil Survey website. Characteristics described for each soil include Preferred Tree Species to Manage, Soil Rutting Hazard, and Normal Year Dry Weight Forage Production. These descriptions should be reviewed during planning of all forest stewardship management activities to assess site potential and limitations.

Preferred Tree Species to Manage – Species are listed in order of potential productivity for each soil type. The first species listed is the species for which the best growth rates are anticipated. The following species are also well suited to the soil type but may grow at slower rates. These species may not all be currently present on the soil type but management activities can be structured to favor the species indicated. For example if ponderosa pine is listed and a preferred species but is not currently present on the site the owner may consider planting following harvest to improve species diversity. Thinning operations should strive to maintain a mix of all species suited to the soil type.

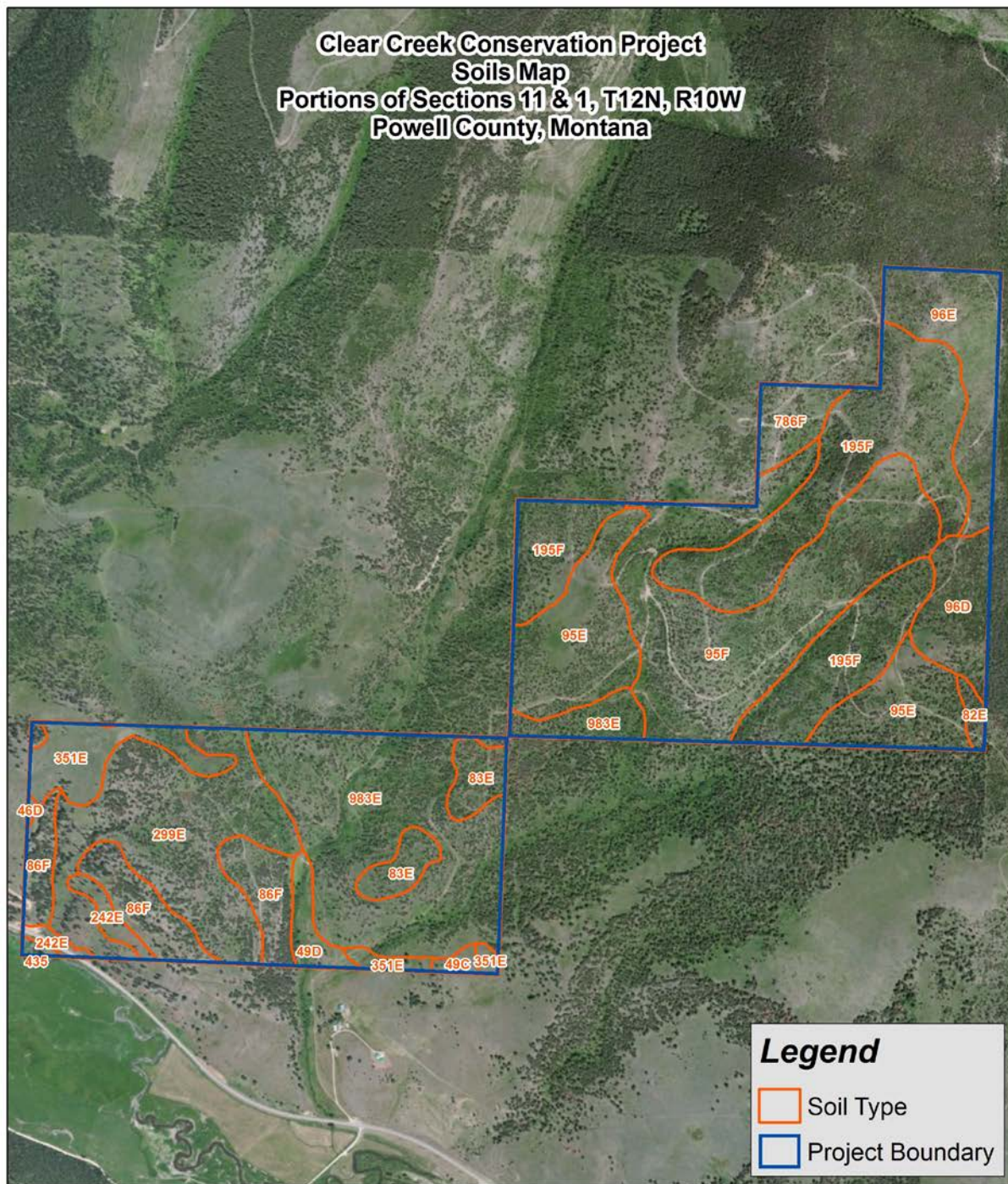
Soil Rutting Hazard – Numerous soil types on the property are vulnerable to soil rutting. On these soil types equipment operation should be limited to dry or frozen ground to reduce the potential for soil damage. Roads constructed on vulnerable soils are also prone to rutting and may require additional maintenance. Road use may need to be restricted during wet periods of the year to avoid damage to the road bed and potential for erosion associated with ruts in the road surface. Road drainage features should be installed and maintained in these soil types.

Normal Year Dry Weigh Forage Production – These figures represent potential forage production during years with normal precipitation and temperatures. The figures are probably most useful in determining which soil types have the greatest relative potential for forage production under an appropriate range management program.

Table 3: Soil Type Description

Soil Type	Preferred Tree Species to Manage	Soil Rutting Hazard	Normal Year Dry Weight Forage Production (lbs/ac)	Acres in Project Area
195F - Yreka gravelly loam, cool, 35 to 60 percent slopes	Douglas-fir, Ponderosa Pine	Slight	500	144.0
95F - Yreka gravelly loam, 35 to 60 percent slopes	Douglas-fir, Ponderosa Pine	Slight	1000	125.0
983E - Crow-Bignell complex, 15 to 35 percent slopes	Ponderosa Pine, Western Larch, Douglas-fir	Severe	400	124.0
299E - Bignell, dry-Yreka, cool, complex, 15 to 35 percent slopes	Ponderosa Pine, Western Larch, Douglas-fir	Severe	350	92.0
95E - Yreka gravelly loam, 15 to 35 percent slopes	Douglas-fir, Ponderosa Pine	Slight	1000	75.4
86F - Winkler gravelly loam, 35 to 60 percent slopes	Ponderosa Pine, Douglas-fir	Slight	350	44.0
96E - Worock gravelly loam, cool, 15 to 35 percent slopes	Douglas-fir, Ponderosa Pine	Severe	300	41.5
351E - Roy-Shawmut-Danvers complex, 15 to 35 percent slopes	Grass	Severe	1100	28.6
96D - Worock gravelly loam, cool, 8 to 15 percent slopes	Douglas-fir, Ponderosa Pine	Severe	300	25.1
83E - Crow clay loam, 15 to 35 percent slopes	Ponderosa Pine, Western Larch, Douglas-fir	Severe	400	19.1
786F - Winkler gravelly loam, cool, 35 to 60 percent slopes	Ponderosa Pine, Douglas-fir	Slight	500	14.8
49D - Danvers clay loam, 8 to 15 percent slopes	Grass	Severe	1400	9.1
242E - Braziel gravelly loam, 15 to 35 percent slopes	Grass	Severe	1200	8.4
82E - Elve gravelly loam, 15 to 35 percent slopes	Lodgepole Pine	Severe	300	3.4
49C - Danvers clay loam, 4 to 8 percent slopes	Grass	Severe	1400	2.6
435 - Saypo loam, cool, 0 to 4 percent slopes	Grass	Severe	2500	1.5
46D - Roy loam, 8 to 15 percent slopes	Grass	Severe	1200	0.7

CCCP Soils Map



Northwest Management
1417 Orange st.
Helena, MT 59601
(406)442-7555
www.consulting-foresters.com

0 500 1,000 2,000 3,000 Feet

2013 Imagery



Resource Category IV: Aesthetics and Recreation

Maintenance of an aesthetically pleasing forest landscape is a forest management objective for the CCCP ownership as it provides recreational opportunities and is well used by the public during hunting season. Potential impacts to aesthetic quality associated with forest management activities are typically associated with timber harvests, wildfires, and forest roads. These potential impacts are a management concern across the ownership. Maintaining scenic quality of the ownership maintains real estate values and a public perception that lands are “well managed”. Tourism is an important component of the local economy and many visitors to the area value the opportunity to view and recreate in open spaces and relatively natural landscapes.

Visual impacts associated with timber harvests can be mitigated in a number of ways. Replicating patterns of natural disturbances in the design of harvest units maintains a “natural” appearing landscape. Selection harvests along roadways and highly visual areas can be modified to maintain a higher degree of crown cover. This is especially important on steep slopes that are most visible. Development of uneven-aged forest structures in visually significant areas can reduce the need to significantly reduce tree crown cover during a harvest entry. It also provides an opportunity to retain large diameter old growth trees and “character trees” that appeal to a public that values a natural appearing landscape.

Utilizing harvest technology that minimizes soil disturbance also can reduce visual impacts. Where forest road construction is necessary roads can be located to minimize visual impacts. Avoiding road construction on steep slopes minimizes potential exposure of cut and fill slopes. Developing cooperative road use agreements with neighboring ownerships can reduce the need for new road construction. Maintaining a higher degree of forest cover adjacent to roads can help to screen them. Avoiding use of ground based harvest equipment of slopes that exceed 45% will limit visual impacts associated with rutting, skid trail construction and soil disturbance.

Forest management practices that reduce fuel loading will decrease the risk of catastrophic fire. The visual and environmental effects of high intensity fires can remain on the landscape for decades and are generally viewed as undesirable by the public.

Implementing forest management practices that reduce the risk of insect and disease infestation can minimize the extent of impacted areas and reduce the necessity of treating large forested areas that have been severely impacted in a short period of time.

Resource Category V: Threatened and Endangered Species

Species of Concern

The Montana Natural Heritage Program compiles and maintains existing inventory data for biological diversity in Montana. This inventory includes plant and animal species, unique plant communities or other biological features that are rare and potentially threatened by extinction in Montana. A query of the Montana Natural Resource Information System determined that there are several animal Species of Concern whose ranges occur within the vicinity of the subject property. No plant Species of Concern were reported.

Identified animal Species of Concern include the Canada lynx. The lynx is listed as a threatened species by the U.S. Fish and Wildlife Service. A description of the lynx, as well as management recommendations for the species, is listed in the Appendix. Also included in the Appendix is the Species of Concern Report and Map prepared by the Montana Natural Heritage Program for the subject property.

Resource Category VI: Forest Road Management

Benefits and Potential Impacts of Forest Roads

Forest road systems provide numerous benefits such as providing access for timber harvesting, recreation, fire control, game retrieval, and land management. The harvest of forest products usually depends on road access, and decreased road densities can result in increased timber harvesting costs. Roads provide access that can increase the efficiency of fire suppression and can act as linear firebreaks that reduce fire spread.

Potential detrimental effects associated with roads include sedimentation, habitat fragmentation, loss in soil productivity, invasion by noxious and exotic weeds, use conflicts and destructive human actions such as trash dumping, illegal hunting and wildfires. Weed species that disperse along roadsides can spread to adjacent native plant communities. Actively controlling access, when and how people are permitted to use roads is important if detrimental effects are to be mitigated.

Increased road access can accelerate rates of wildlife harassment and poaching. Several wildlife species have been shown to be adversely affected by encounters with people on roads. Other road related consequences to wildlife can include removal of snags near roadsides by firewood cutters. Removal of snags eliminates habitat for many cavity-nesting birds and mammals.

Surface erosion from road surfaces, cut banks, and ditches can be a significant source of sediment in streams. Rates of sediment delivery are highest in the first five years following road construction and can be closely related to traffic volume on unpaved roads. Surface erosion problems are worse where roads are constructed on highly erodible soils. Lack of road maintenance or poorly timed maintenance can contribute to increases on sediment production on existing roads. Implementing improved road construction standards and actively maintaining roads will reduce road related surface erosion. Road location, design, construction and maintenance are especially critical near streams. Placement of surfacing material, installing

proper drainage structures and prompt establishment of vegetation on road surfaces are actions that will reduce sediment production from road surfaces.

Active road system management will enhance benefits received from the existence of a road system. Many of the detrimental effects associated with roads can be mitigated through planning, access control, maintenance and restricting how and when roads are utilized by people and vehicles. Roads with chronic sedimentation or erosion problems can be rehabilitated, relocated or decommissioned.

Resource Category VII: Cultural Resources

The subject property has no known historical building structures and no cultural resources were observed during forest inventory work conducted on the property for the purposes of this report.

APPENDIX

Species of Concern Report and Map

Photographic Point Location Map with Road Locations

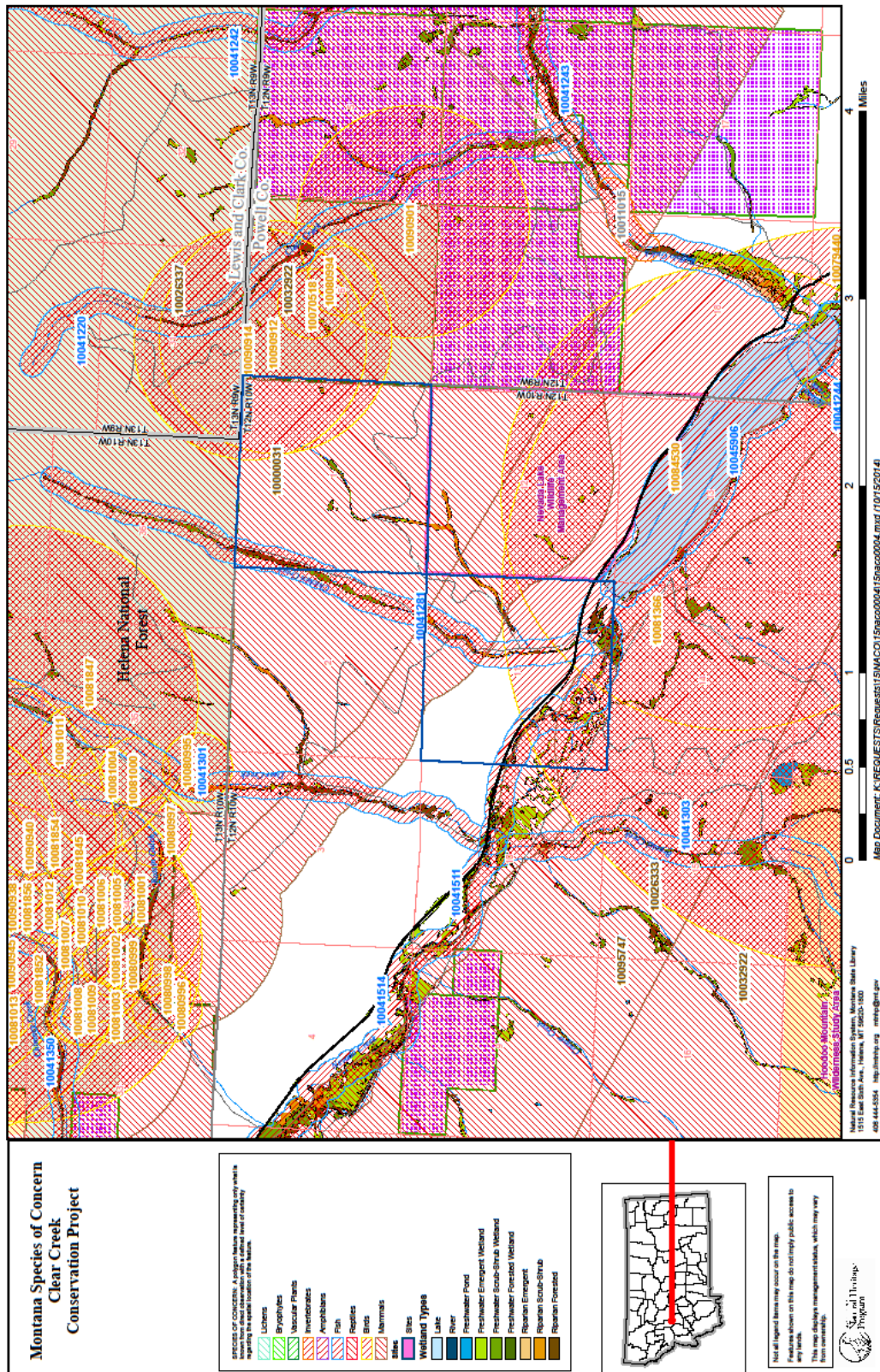
Photo Point Coordinates

Photos of Subject Property

Glossary of Terms

References and Sources

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Montana Natural Heritage Program
Natural Resources Information System
Business State Library
PO Box 20460
Helena, MT 59620-0460
509/444-3029 extn104@dnr.gov

Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Wednesday, October 15, 2014

Haliaeetus leucocephalus

[View Species in MT Field Guide](#)

Common Name: Bald Eagle

General Habitat: Riparian forest

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 2,000 meters in order to be conservative about encompassing the breeding territory and area commonly used for re-nesting and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S4

Global: G5

FWP CFWCS Tier: 1

MT PIF Code: 2

Federal Agency Status:

U.S. Fish & Wildlife Service: DM; BGEPA; MBTA; BCC

U.S. Forest Service: SENSITIVE

U.S. Bureau of Land Management: SENSITIVE

Species Occurrences

Species Occurrence Map Label: 10084530

First Observation Date: 03/01/1985

Last Observation Date: 09/01/2008

SO Number:

Acreage: 3,105

Psiloscops flammeolus

[View Species in MT Field Guide](#)

Common Name: Flammulated Owl

General Habitat: Dry conifer forest

Description: Birds

Mapping Delineation:

Confirmed breeding area based on the presence of a nest, chicks, or territorial adults during the breeding season. Point observation location is buffered by a minimum distance of 300 meters in order to encompass the maximum breeding territory size reported for the species and otherwise is buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3B

Global: G4

FWP CFWCS Tier: 1

MT PIF Code: 1

Federal Agency Status:

U.S. Fish & Wildlife Service:

U.S. Forest Service: SENSITIVE

U.S. Bureau of Land Management: SENSITIVE

Species Occurrences

Species Occurrence Map Label: 10080995

First Observation Date: 06/16/2005

Last Observation Date: 06/16/2005

SO Number:

Acreage: 70



Montana Natural Heritage Program
Natural Resources Information System
Butte State Library
PO Box 20460
Butte, MT 59720-0460
(406) 241-3339 ext.101
mnhp@mt.gov

Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Wednesday, October 15, 2014

Species Occurrences

Species Occurrence Map Label:	10080994		
First Observation Date:	06/21/1995	SO Number:	
Last Observation Date:	06/21/1995	Acreage:	70

Strix nebulosa

[View Species in MT Field Guide](#)

Common Name: Great Gray Owl

General Habitat: Conifer forest near open meadows

Description: Birds

Mapping Delineation:

Confirmed nesting area buffered by a minimum distance of 3,200 meters in order to encompass the known foraging distance and area likely to be used for re-nesting and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

U.S. Fish & Wildlife Service:

U.S. Forest Service:

U.S. Bureau of Land Management: SENSITIVE

FWP CFWCS Tier: 2

MT PIF Code: 3

Species Occurrences

Species Occurrence Map Label:	10081366		
First Observation Date:	06/25/2001	SO Number:	
Last Observation Date:	06/25/2001	Acreage:	7,949

Dryocopus pileatus

[View Species in MT Field Guide](#)

Common Name: Pileated Woodpecker

General Habitat: Moist conifer forests

Description: Birds

Mapping Delineation:

Observations with evidence of breeding activity buffered by a minimum distance of 1,500 meters in order to be conservative about encompassing home ranges and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

Federal Agency Status:

U.S. Fish & Wildlife Service:

U.S. Forest Service:

U.S. Bureau of Land Management:

FWP CFWCS Tier: 2

MT PIF Code: 2



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(406) 241-3339 ext.20460@mt.nhp.gov

Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Wednesday, October 15, 2014

Species Occurrences

Species Occurrence Map Label:	10081847		
First Observation Date:	05/31/2010	SO Number:	
Last Observation Date:	06/20/2010	Acreage:	1,747

Nucifraga columbiana

[View Species in MT Field Guide](#)

Common Name: Clark's Nutcracker

General Habitat: Conifer forest

Description: Birds

Mapping Delineation:

Observations with evidence of breeding activity buffered by a minimum distance of 1,000 meters in order to be conservative about encompassing the spring/summer breeding territories of family groups and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3

Global: G5

FWP CFWCS Tier: 3

MT PIF Code: 3

Federal Agency Status:

U.S. Fish & Wildlife Service:

U.S. Forest Service:

U.S. Bureau of Land Management:

Species Occurrences

Species Occurrence Map Label:	10090912		
First Observation Date:	06/21/1995	SO Number:	
Last Observation Date:	06/21/1995	Acreage:	776

Species Occurrence Map Label:	10090914		
First Observation Date:	06/21/1995	SO Number:	
Last Observation Date:	06/21/1995	Acreage:	776

Species Occurrence Map Label:	10090901		
First Observation Date:	06/21/1995	SO Number:	
Last Observation Date:	06/27/1996	Acreage:	776

Haemorhous cassinii

[View Species in MT Field Guide](#)

Common Name: Cassin's Finch

General Habitat: Drier conifer forest

Description: Birds

Mapping Delineation:

Observations with evidence of breeding activity buffered by a minimum distance of 300 meters in order to be conservative about encompassing the courtship and foraging distance from nesting areas and otherwise buffered by the locational uncertainty associated with the observation up to a maximum distance of 10,000 meters.



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Montana State Library
PO Box 301400
Helena, MT 59620-1400
p301400.2010.mtnhp.org

Species of Concern Data Report

Visit <http://mtmnhp.org> for additional information.

Report Date:
Wednesday, October 15, 2014

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

FWP CFWCS Tier: 3

MT PIF Code: 3

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#)

[U.S. Forest Service:](#)

[U.S. Bureau of Land Management:](#)

Species Occurrences

Species Occurrence Map Label:	10070518		
First Observation Date:	06/21/1995	SO Number:	
Last Observation Date:	06/21/1995	Acreage:	70

Oncorhynchus clarkii lewisi

[View Species in MT Field Guide](#)

Common Name: Westslope Cutthroat Trout

Description: Fish

[General Habitat:](#) Mountain streams, rivers, lakes

Mapping Delineation:

Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 30 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S2
Global: G4T3

FWP CFWCS Tier: 1

MT PIF Code:

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#)

[U.S. Forest Service:](#) SENSITIVE

[U.S. Bureau of Land Management:](#) SENSITIVE

Species Occurrences

Species Occurrence Map Label:	10041301		
First Observation Date:		SO Number:	
Last Observation Date:		Acreage:	261

Species Occurrence Map Label:	10041281		
First Observation Date:		SO Number:	
Last Observation Date:		Acreage:	289



Montana Natural Heritage Program
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Montana State Library
PO Box 204603
Helena, MT 59620-0603
p303.444.2020 mnhp@mt.gov

Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Wednesday, October 15, 2014

Species Occurrences

Species Occurrence Map Label:	10041220	SO Number:	
First Observation Date:		Acreage:	308
Last Observation Date:			

Species Occurrence Map Label:	10041303	SO Number:	
First Observation Date:		Acreage:	352
Last Observation Date:			

Species Occurrence Map Label:	10045006	SO Number:	
First Observation Date:		Acreage:	427
Last Observation Date:			

Species Occurrence Map Label:	10041514	SO Number:	
First Observation Date:		Acreage:	2,115
Last Observation Date:			

Salvelinus confluentus

[View Species in MT Field Guide](#)

Common Name: Bull Trout

[General Habitat:](#) Mountain streams, rivers, lakes

Description: Fish

Mapping Delineation:

Stream reaches and standing water bodies where the species presence has been confirmed through direct capture or where they are believed to be present based on the professional judgement of a fisheries biologist due to confirmed presence in adjacent areas. In order to reflect the importance of adjacent terrestrial habitats to survival, stream reaches are buffered 100 meters, standing water bodies greater than 1 acre are buffered 30 meters, and standing water bodies less than 1 acre are buffered 30 meters into the terrestrial habitat based on PACFISH/INFISH Riparian Conservation Area standards.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S2
Global: G4

Federal Agency Status:

[U.S. Fish & Wildlife Service:](#) LT
[U.S. Forest Service:](#) THREATENED
[U.S. Bureau of Land Management:](#) SPECIAL STATUS

[FWP CEWCS Tier:](#) 1

[MT PIE Code:](#)

Species Occurrences

Species Occurrence Map Label:	10041511	SO Number:	
First Observation Date:		Acreage:	1,499
Last Observation Date:			



Montana Natural Heritage Program
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Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Wednesday, October 15, 2014

Martes pennanti

[View Species in MT Field Guide](#)

Common Name: Fisher

General Habitat: Mixed conifer forests

Description: Mammals

Mapping Delineation:

Confirmed area of occupancy based on the documented presence of adults or juveniles within tracking regions containing core habitat for the species. Outer boundaries of tracking regions are defined by areas of forest cover on individual mountain ranges or clusters of adjacent mountain ranges with continuous forest cover.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3

Global: G5

FWP CFWCS Tier: 2

MT PIF Code:

Federal Agency Status:

U.S. Fish & Wildlife Service:

U.S. Forest Service: SENSITIVE

U.S. Bureau of Land Management: SENSITIVE

Species Occurrences

Species Occurrence Map Label: 10032922

First Observation Date: 11/24/1980

SO Number: 2

Last Observation Date: 03/22/2011

Acreage: 6,723,069

Gulo gulo

[View Species in MT Field Guide](#)

Common Name: Wolverine

General Habitat: Boreal Forest and Alpine Habitats

Description: Mammals

Mapping Delineation:

Confirmed area of occupancy supported by recent (post-1980), nearby (within 10 kilometers) observations of adults or juveniles. Tracking regions were defined by areas of primary habitat and adjacent female dispersal habitat as modeled by Inman et al. (2013). These regions were buffered by 1 kilometer in order to link smaller areas and account for potential inaccuracies in independent variables used in the model.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3

Global: G4

FWP CFWCS Tier: 2

MT PIF Code:

Federal Agency Status:

U.S. Fish & Wildlife Service: C

U.S. Forest Service: SENSITIVE

U.S. Bureau of Land Management: SENSITIVE

Species Occurrences

Species Occurrence Map Label: 10000031

First Observation Date: 03/01/1958

SO Number:

Last Observation Date: 03/15/2013

Acreage: 1,326,340



Montana Natural Heritage Program
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Montana State Library
PO Box 204460
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Species of Concern Data Report

Visit <http://mtnhp.org> for additional information.

Report Date:

Wednesday, October 15, 2014

Species Occurrences

Species Occurrence Map Label:	10095747		
First Observation Date:	12/01/1976	SO Number:	
Last Observation Date:	02/15/1993	Acreage:	287,085

Lynx canadensis

[View Species in MT Field Guide](#)

Common Name: Canada Lynx

General Habitat: Subalpine conifer forest

Description: Mammals

Mapping Delineation:

Areas designated as Critical Habitat for the species by the U.S. Fish and Wildlife Service on February 23, 2009 because they currently contain physical and biological features (e.g. boreal forests with snowshoe hare) essential to the conservation of the species.

Species Status

[Click Status for Explanations](#)

Natural Heritage Ranks:

State: S3
Global: G5

FWP CFWCS Tier: 1

MT PIF Code:

Federal Agency Status:

U.S. Fish & Wildlife Service: LT

U.S. Forest Service: THREATENED

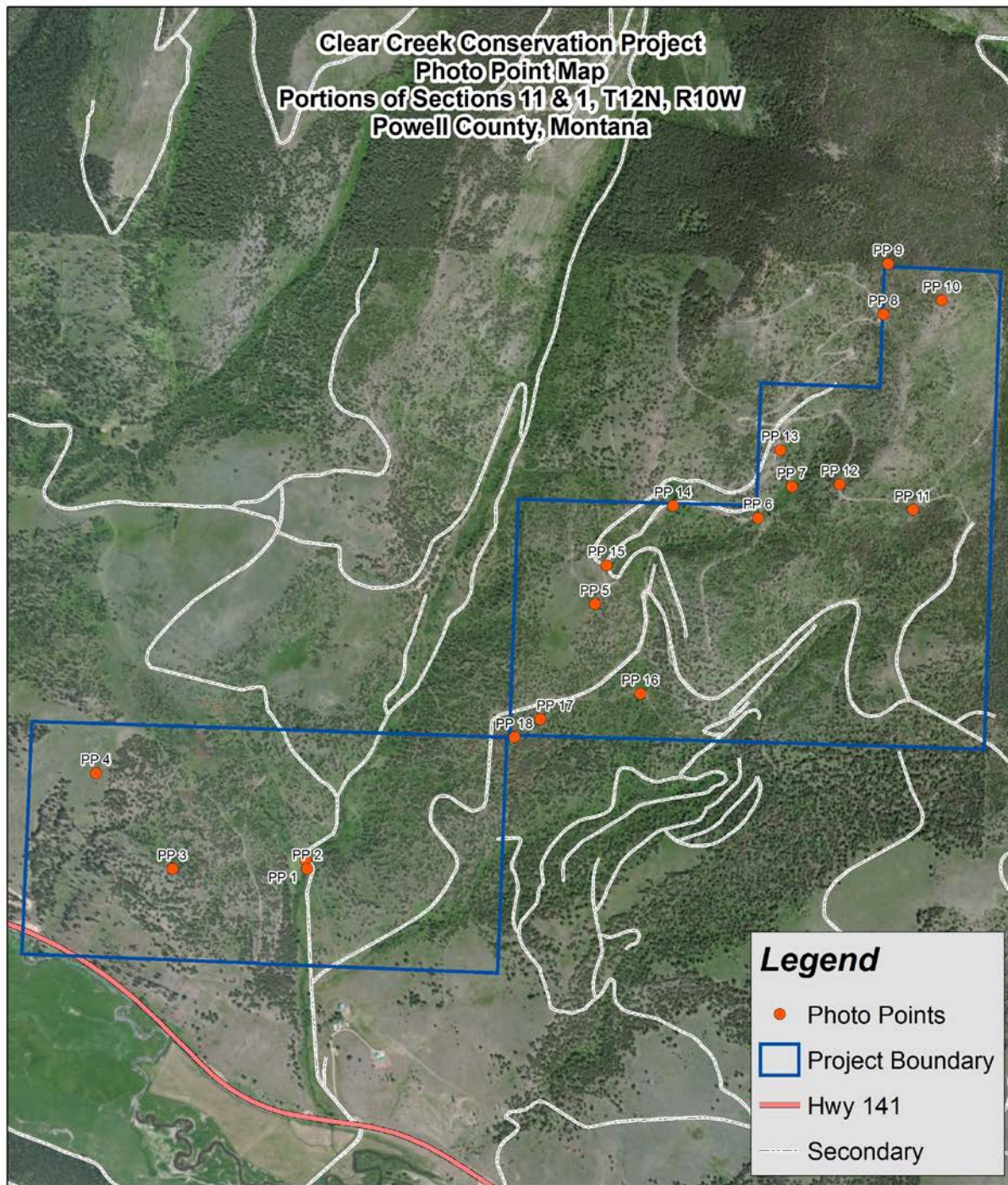
U.S. Bureau of Land Management: SPECIAL STATUS

Species Occurrences

Species Occurrence Map Label:	10026333		
First Observation Date:		SO Number:	8
Last Observation Date:		Acreage:	80,913

Species Occurrence Map Label:	10026337		
First Observation Date:	01/01/1895	SO Number:	6
Last Observation Date:	03/23/2010	Acreage:	4,334,628

CCCP Photo Point Map



Northwest Management
1417 Orange st.
Helena, MT 59601
(406)442-7555
www.consulting-foresters.com

0 500 1,000 2,000 3,000 Feet

2013 Imagery



Table 4: Photo Point Coordinates

Photo	Latitude	Longitude
1	46.812853	-112.818238
2	46.812603	-112.818146
3	46.812425	-112.824105
4	46.81522	-112.827654
5	46.820999	-112.805927
6	46.823816	-112.798884
7	46.824809	-112.797454
8	46.830151	-112.793725
9	46.831689	-112.793613
10	46.830652	-112.791164
11	46.824268	-112.79206
12	46.824939	-112.795335
13	46.825904	-112.798024
14	46.824075	-112.802666
15	46.822182	-112.805488
16	46.818335	-112.803762
17	46.817435	-112.808141
18	46.816858	-112.809227

CCCP Photos



Photo Point 1: Armored Ford
Azimuth: 090°



Photo Point 2: Perennial Stream
Azimuth: 180°



Photo Point 3: DF/PP 3M Forest Stand Type
Azimuth: 000°



Photo Point 4: Elk Rub in Intermountain Grassland
Azimuth: 195°



Photo Point 5: View of Section 11 from Section 1
Azimuth: 200°



Photo Point 6: Stream Crossing
Azimuth: 225°



Photo Point 7: Spring/ Head of Stream
Azimuth: 180°



Photo Point 8: LP/DF 2M Forest Stand Type
Azimuth: 015°



Photo Point 9: Fence Line Along CCCP
Boundary
Azimuth: 090°



Photo Point 10: High Point of Section 1
Azimuth: 170°



Photo Point 11: Beetle-killed Lodgepole Pine
Azimuth: 165°



Photo Point 12: Western Spruce Budworm Mortality
Azimuth: 270°



Photo Point 13: Spruce Budworm Defoliation
Azimuth: 090°



Photo Point 14: Spring Infested with Houndstongue
Azimuth: 090°



Photo Point 15: Spotted Knapweed in
Intermountain Grassland
Azimuth: 225°



Photo Point 16: Seasonally Dry Stream
Azimuth: 180°



Photo Point 17: Snag/ Mixed Age Stand
Azimuth: 090°



Photo Point 18: Beetle-Killed Ponderosa Pine/
Property Corner
Azimuth: 225°

Glossary of Terms

EVEN-AGED STAND:--A stand is generally considered even-aged if the difference between the oldest and youngest tree does not exceed 20% of the length of the rotation.

CLEARCUT:--Removal of the entire stand in one cutting.

REGENERATION:--Obtained by planting or natural seeding from adjacent stands.

SEED TREE:--Removal of the mature timber in one cutting, except for a small number of seed trees left singly or in groups.

UNEVEN-AGED MANAGEMENT:--An uneven-aged stand contains at least three age classes intermingled on the same area. A balanced uneven-aged stand consists of 3 or more different age classes each occupying an approximately equal area.

SINGLE TREE SELECTION:--Removal of single mature individuals or very small groups of mature trees. This favors the development of shade tolerant species in most cases.

Logging by this method is usually difficult and expensive.

GROUP SELECTION:--Removal of all mature timber in a small area, usually less than one acre but up to three acres in size. This creates an aggregation or mosaic of even-aged clumps, with clumps of differing ages. This modification is more readily adapted to a wide variety of conditions than any other. The ecological requirements of most species can be met within its framework. It is also easier to create the kinds of environmental conditions necessary for reproduction. The openings can be allowed to seed in naturally or can be planted if particular species are desired and their establishment is expected to be difficult.

OVERSTORY REMOVAL:--Removal of all material over a certain size (usually 9" DBH) where a manageable understory is present. The understory should be uniform, healthy, vigorous and composed of desirable species. This technique often leaves suppressed and poorly formed trees as part of the residual stand.

COMMERCIAL THIN:--Can be applied to even or uneven-aged stands. Commonly used to describe operations that are designed to control stocking, improve spacing between trees or remove trees of poor vigor or form. Harvested trees are large enough to be sold as wood products, including sawlogs, chip-and-saw or small sawlogs, pulp and fiberwood.

SANITATION/SALVAGE:--Removal of dead, dying, diseased or high risk trees. Typically a light harvest, this technique sometimes treats the symptoms rather than the problems.

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